

SOUTHERN POWER AND INDUSTRY

Ad Index, page 136

APRIL, 1954

In This Issue

Air Coolers for Condenser Service 68

At Pampa, Texas, 26 units handle approximately 80% of Celanese Corporation's total cooling load.

Aluminum Electrical Conductors 70

Power and feeder cable; transmission and distribution; Southern and Southwestern applications.

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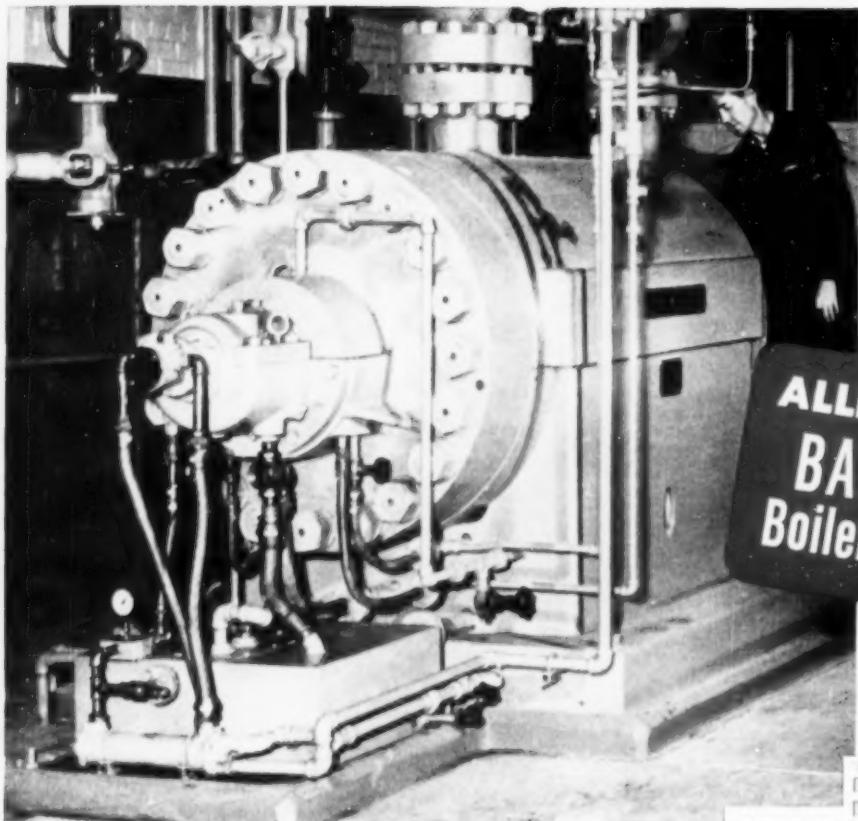
Design and operational report on Camp Manufacturing Company's new bleach plant in Virginia.

Power for Lone Star Steel—Texas 78

Supply for \$87 million steel mill expansion provided by new unit and public utility tie-in.

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Ideas . . Methods
Starts page 92**



One of three barrel-type boiler feed pumps at the Lake Catherine station of Arkansas Power and Light Company. Rated at 525,000 lb/hr, 1800 psig discharge, 3575 rpm, water temperature 350 F. Station engineered by Ebasco Services, Inc.

ALLIS-CHALMERS BARREL-TYPE Boiler Feed Pumps



Chosen by Arkansas Power and Light because performance is service proved

Low maintenance, high efficiency

Low maintenance, high efficiency performance records in power plants in all parts of the country . . . that's what led Arkansas Power and Light Company to choose Allis-Chalmers barrel-type boiler feed pumps for their newest outdoor-type station.

Proved design features

Back of that performance record stand many proved design features. For instance, first stage has twin, single-suction impellers to give low NPSH requirement for highest efficiency under fluctuating loads. Impellers mounted back-to-

back balance axial forces without balancing drum. Expansion joint and shaft seals are brought to outside of pump where they may be inspected often and worked on easily, if required.

Complete unit from one source

Allis-Chalmers can supply the complete pumping unit — pump, motor and control — of coordinated design and manufacture. You get one responsibility — one guarantee of satisfaction.

Get complete information on Allis-Chalmers barrel-type boiler feed pumps. Call your Allis-Chalmers District Office or write Allis-Chalmers, Milwaukee 1, Wisconsin for Bulletin 08B7899.

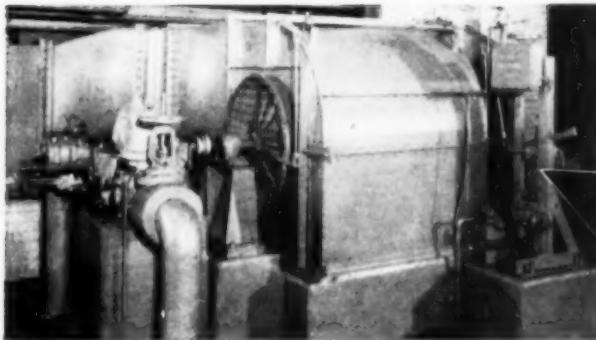
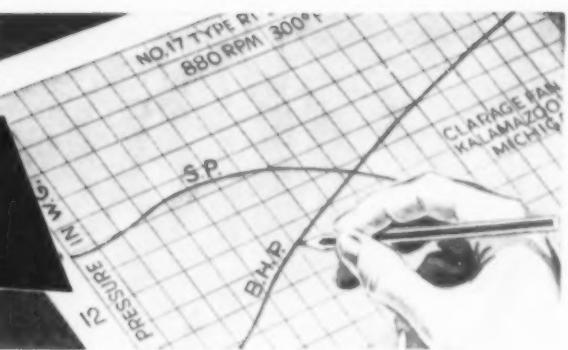
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ALLIS-CHALMERS

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figured right!



built right!

- The most exacting service a fan gets into is mechanical draft.

If the fan is too small, you may lack capacity for peak loads . . . too large, and you may have wasted money and space . . . inferior construction, and, well, that's real trouble.

We are specialists with long experience in meeting mechanical draft problems.

You can have faith in a Clarge recommendation—faith that your job is figured RIGHT for the required performance—faith that the equipment is built RIGHT to operate year after year with minimum attention and care.

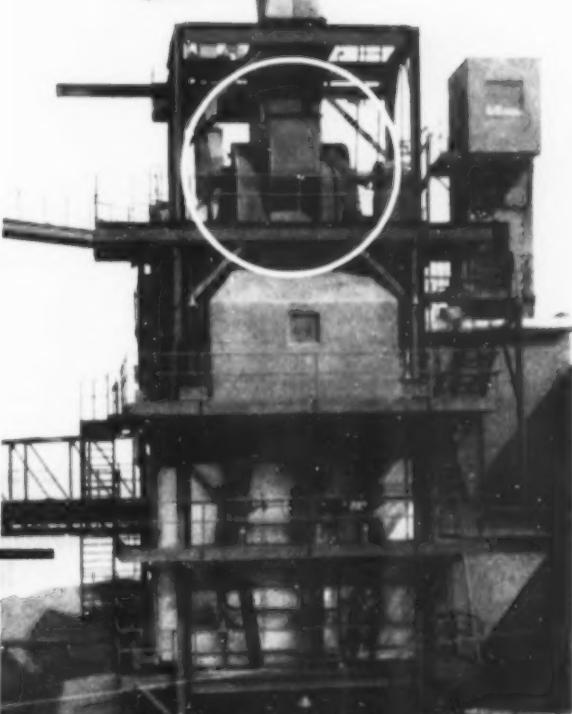
Boiler and stoker manufacturers have a high regard for Clarge engineering and construction. Ask anyone of them, or write us for detailed information.

CLARGE FAN COMPANY
KALAMAZOO, MICHIGAN

**Over 3000 Public Utilities and
Industrial Power Plants
Use Clarge Mechanical Draft Fans**

You can Rely on...
CLARGE

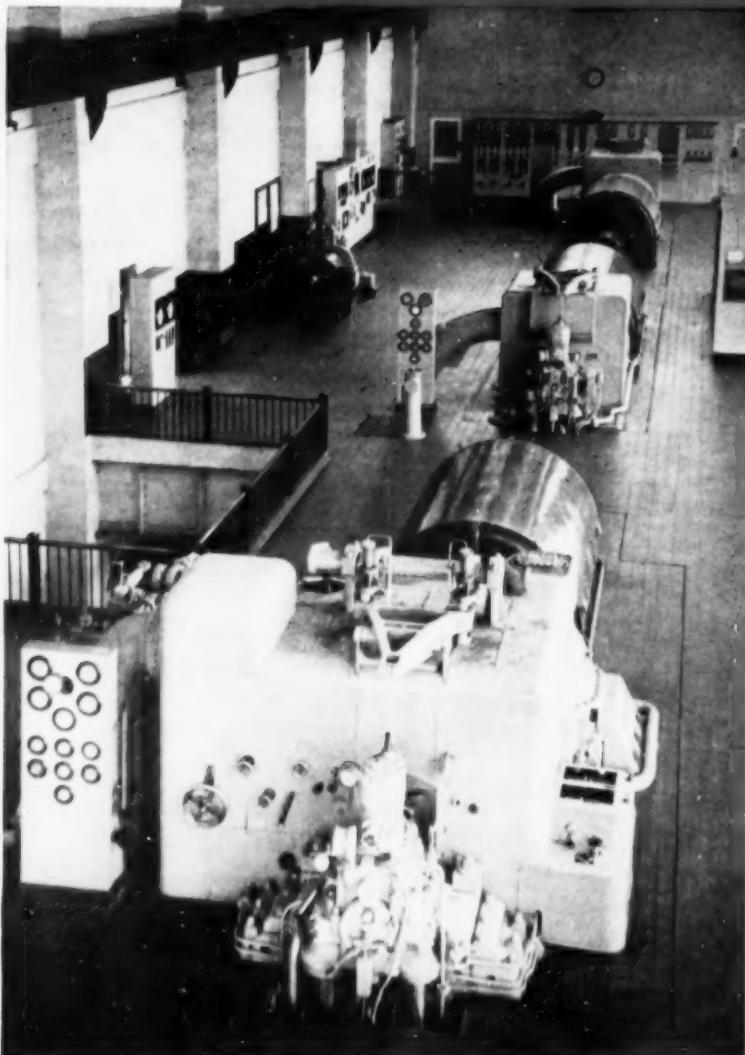
SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES • IN CANADA: Canada Fans, Ltd., 4285 St. Richelieu St., Montreal



**Headquarters for
Air Handling and
Conditioning Equipment**



USE THE OIL THAT ASSURES "ADDED" PROTECTION



TODAY'S DEMANDS for power demand the best in turbine lubrication — *Texaco Regal Oil (R & O)*. This is the oil that has *more than ten times the oxidation resistance of ordinary turbine oils!* It keeps turbine systems free from sludge, rust and foam.

Texaco Regal Oil (R & O) is especially refined from top quality base stocks — then *made even better* by powerful inhibitors of oxidation, rust and foam. This "added" protection means you'll have clean systems, normal bearing temperatures, instant governor response.

There is a complete line of *Texaco Regal Oils (R & O)* for every type and size of turbine. They meet the stringent requirements of all leading turbine builders.

A Texaco Lubrication Engineer will gladly help you improve turbine performance. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.



TEXACO Regal Oils (R & O) FOR ALL TURBINES

TUNE IN . . . METROPOLITAN OPERA radio broadcasts every Saturday afternoon. See newspaper for time and station.

SOUTHERN POWER AND INDUSTRY

Vol. 72
No. 4

APRIL
1954

NBP



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Editorial and Executive Offices:

SOUTHERN POWER & INDUSTRY, 806 PEACHTREE ST., N. E., ATLANTA 5, GEORGIA

Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

April, 1954

► MORE PLASTIC PIPE--SP&I for March, pages 50 and 51, described the quarter-of-a-mile 3" tenite butyrate pipe recently installed by Carolina Power and Light Company's Wilmington, N. C., station. Plastic pipe line operates at 50 psi and conducts corrosive water.

Another recently reported job is the 4" underground cable conduit installation by Community Public Service Company at Pecos, Texas. Use of the pipe meant an immediate 80% time savings. Other features --it was light, easy and convenient to handle and it withstands strong alkali soil perfectly.

► PALLETIZED PURCHASES--Studies at Convair's Fort Worth, Texas, plant show how improved material packaging pays off. Two improvements that are saving time and money and reducing damage to the materials handled, cover carload shipments of paper towels and both car and truck shipments of plywood.

Paper towel cartons are now banded on disposable pallets at the shipping point. Palletizing by vendor permits efficient handling with fork truck. Unloading a carload of plywood sheets by hand formerly required 32 hours. With palletization carload can now be unloaded in 2 hours by a single fork truck.

Specific cost data is reported in this issue. Other products are being studied by Convair with promise of additional extensive savings.

► AN ATOMIC POWERED LOCOMOTIVE is "on the boards" with engineers from five major railroads and six engineering firms cooperating in the design. There are no immediate construction plans. Designed for an output of 7,000 hp, locomotive will cost \$1,200,000 to build. Comparable three-unit diesel combination would cost around \$750,000. However, the atomic powered locomotive could be operated continuously for 24 days before refueling. Under normal conditions, this would mean refueling about six times a year. Estimates indicate that the annual fuel cost would be approximately 85% of that for a comparable diesel.

► EXTRUDED INTERNAL FIN TUBING by B&W will be of interest to those associated with unusual problems of heat transfer. Surface area is greatly increased, thus permitting a greater transfer of heat in a tube of a given length and diameter.

► ALUMINUM ELECTRICAL CONDUCTORS--Consider an aluminum design on the basis of aluminum's characteristics rather than on a substituting process. You can then take advantage of aluminum's lower cost, lighter weight and the resultant ease of installation.

Several Southern and Southwestern power and feeder cable and transmission and distribution applications, supplemented by plant tested joining and terminating techniques, are featured in this issue of SP&I.

(Continued on page 6)

Extra!



Contact may be reversed by removing one screw

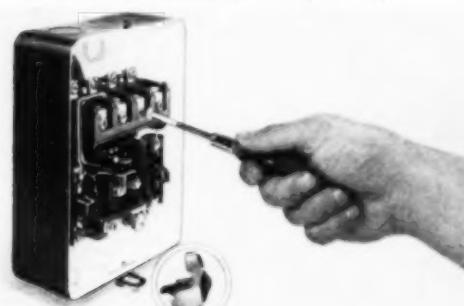
Handy Auxiliary Contacts for all Allen-Bradley Sizes 0 and 1 Solenoid Controls

Do you want to add one or more extra pilot contacts to some of your Allen-Bradley solenoid switches . . . to operate indicator lights, relays, or other starters?

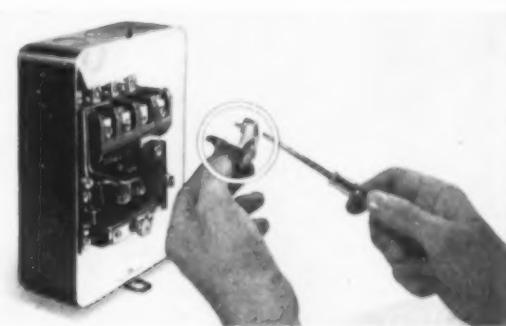
These new, compact auxiliary contacts can now be added to the arc hood of any and all standard sizes 0 and 1 solenoid switches. The operating arm of the auxiliary contact is actuated by the up and down motion of the solenoid plunger of the switch to which it is attached.

Write for descriptive literature.

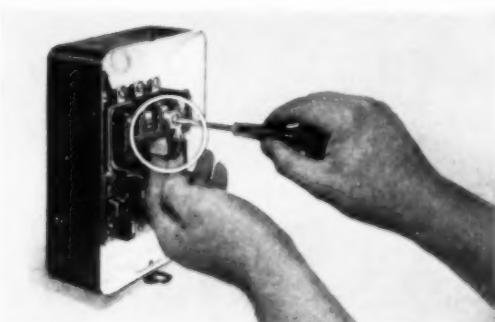
SO SIMPLY APPLIED



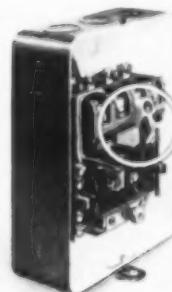
First Remove the terminal screw from the stationary contact block of the Allen-Bradley starter.



Second Insert terminal screw into mounting hole of auxiliary contact to be attached to starter.



Then Screw terminal screw into stationary contact block and fasten auxiliary contact to starter.



Auxiliary Contacts easily changed from n.o. to n.c. operation

The new Allen-Bradley auxiliary contact may be instantly changed from n.o. to n.c. contacts. Removal of one screw permits the instant reversal of the contacts in the contact block. There are no small parts to lose.

**Ready
to
Wire** Allen-Bradley auxiliary contact is now ready to be wired for any auxiliary pilot circuit.



These auxiliary contacts are available for all Allen Bradley sizes 0 and 1 controls, including contactors, reversing switches, combination starters, Bulletin 709 solenoid starters, and Bulletin 609 manual starters.

Allen-Bradley Co., 1328 S. Second St., Milwaukee 4, Wisconsin

ALLEN-BRADLEY

SOLENOID
MOTOR CONTROL

CONSULT YOUR LOCAL ALLEN-BRADLEY REPRESENTATIVE

ALBUQUERQUE—A & A Supply Co., P. O. Box 1516, 114 N. Morningside St., Tel. 5-5506
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BALTIMORE—H. M. Wood & Co., 124 Light St., Tel. Mulberry 4-4653
BIRMINGHAM—W. H. Beaven, 300 So. 23rd St., Tel. 7-5479
CHARLESTON—W. J. Hess, Room 302 Morrison Bldg., 815 Quarrier St., Tel. 2-5323
CHARLOTTE—Le Roy P. Spain, 307 Lincoln St., Tel. 4-6334, 6-4301
DALLAS—J. K. Webb, 2810 McKinney Ave., Tel. Lakeside 5816
HOUSTON—Wilson Electrical Equip. Co., 2930 Commerce Ave., Tel. Atwood 1557
JACKSONVILLE—Robert P. Smith Co., 2031 Hendricks Ave., Tel. 4-4802
KANSAS CITY—B. L. McCreary & Son, 1819 Central, Tel. Harrison 1668

KNOXVILLE—Bowditch & Co., 1311 C. N. Broadway, P. O. Box 3145, Tel. 4-2513
LITTLE ROCK—Curtis H. Stout & Co., P. O. Box 107, 400 Shell St., Tel. 4-8835
LOUISVILLE—Rietze & Co., 139 S. 5th St., Tel. Clay 7716-17
MEMPHIS—Curtis H. Stout & Co., 730 M & Bldg., Tel. 8-7601
NEW ORLEANS—Robbins & Robbins, 1037 Magazine St., Tel. Canal 5805
ST. LOUIS—G. W. Scholichin, 904 No. Grand Blvd., Tel. Lucas 1901-02
SAN ANTONIO—Wilson Elect. Equip. Co., 101 E. Maple St., Circle 4-1472
SAN DIEGO—James A. Setchell, 301 W. "G" St., Tel. Franklin 3981
TULSA—John W. Elder, 1526 East Fourth St., Tel. 3-9149

facts and trends (continued from page 4)

- CHECK ON HIDDEN COSTS in "spot relamping"--Recent demonstration of the "G-E Lamp Burnout Visualizer" proved that GROUP LAMP REPLACEMENT offers substantial economy.

Labor time (the leading factor involved in the cost of relamping) can be reduced from 60 to 85%. Replacing 100 burnouts one at a time takes 33 hours of a maintenance man's time and probably an equal number of hours of lost production time. The labor cost per lamp change is often higher than the cost of the lamp.

This will help: (1) Check present lighting. (2) Employ group relamping, instead of spot relamping, to enjoy mass production benefits. (3) Save the cleanest, brightest 20% of lamps for spares. (4) Replace burnouts from these spares. (5) When all spare lamps have been used, commence next relamping cycle.

- MAGNETIC POSITIONING TOOL eliminates costly fixtures for short run production, as well as 2-man maintenance, production, and welding operations. Standard Portable Cord's holding device, consisting of three permanent magnets, has full 360° adjustment, which is regulated by a scale showing 5" graduations.

- WANT A FREE PREMIUM? An advertisement in SP&I for March asks: "Look--How observant are you? Find two identical ads in this issue (March, 1954). Write that company and receive a handy usable premium." Since you have already read the March issue "cover to cover" (we hope), check it over for those two identical ads and get your free premium.

- SMALLER PRESSURE VESSELS may offer your greatest hazard. If a pressure vessel containing liquids above the pressure boiling point is not in safe condition as determined by competent internal inspection, there may be an extreme hazard. The smaller vessels, often inaccessible for this thorough inspection, are sometimes thought of as unimportant. They frequently present THE GREATEST HAZARD.

If service requirements do not demand temperatures above the pressure boiling point of a liquid, limit the temperature automatically and supplement pressure relief with temperature relief.

- ARC WELDING, despite an enviable record for reliability, is being tremendously handicapped in its application. Lincoln Electric says this handicap is throwing suspicion on the process by writing into specifications expensive and impractical tests which have little to do with the quality of the weld.

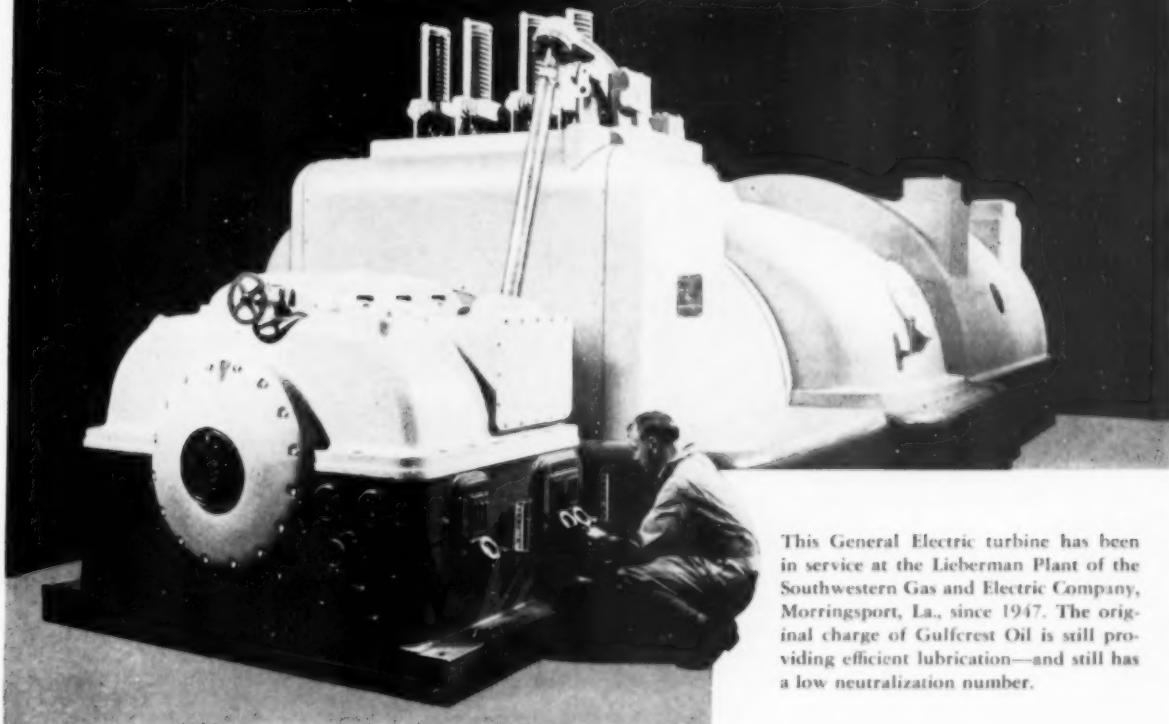
An arc weld is rejected if its ductility is low. Yet riveted joints have no ductility, relatively speaking, and are accepted without question. Riveted joints are made tight by caulking. Resulting undercut is enormous, yet a welding undercut that is almost infinitesimal in comparison is frequently made the reason for rejecting welds.

The contour of the weld deposit is closely inspected but no one examines the contour of any rivet or the hole it may only partially fill. Insured vessels must have their welds x-rayed. Welds are chipped out and rewelded because of trifling porosity; yet no one x-rays a riveted joint.

Despite the fact that arc welding has done a more reliable job than rivets or castings over the past 40 years, Lincoln Electric emphasizes that the engineering profession continuously requires these excessive and uneconomic tests and requirements.

Write the editors for additional information on any of the above items.
SOUTHERN POWER & INDUSTRY. 806 Peachtree St., N.E. Atlanta 5, Ga.

the **RIGHT** oil for every steam turbine -
GULFCREST



This General Electric turbine has been in service at the Lieberman Plant of the Southwestern Gas and Electric Company, Morrisport, La., since 1947. The original charge of Gulfcrest Oil is still providing efficient lubrication—and still has a low neutralization number.

the **RIGHT** base stock, super-refined
the **RIGHT** combination and concentration of additives
the **RIGHT** background of performance

Gulfcrest Oil has a background of successful performance in every type and make of steam turbo-generator.

In many of these installations, the original charge of Gulfcrest has been in service more than 15 years with no significant change in its original characteristics, and with neutralization numbers always remarkably low and safe. That is why Gulfcrest Oil is acclaimed "the world's finest turbine oil."

You'll be joining an impressive group of well satisfied users when you fill your turbine system with this outstanding oil.

Call in a Gulf Sales Engineer and ask him to recommend the proper grade. Or write to the Gulf Oil Corporation, 1822 Gulf Building, Pittsburgh 30, Pennsylvania.

Gulf Oil Corporation • Gulf Refining Company



NEWS for the South and Southwest



G.E. Review's Editor Everett "Sam" Lee Addresses Georgia Engineering Society

EVERETT S. LEE (left), manager of the technical public relations department of G.E. and Editor of the **GENERAL ELECTRIC REVIEW**, spoke on "The Romance of Engineering" at a recent meeting of the Georgia Engineering Society. Mr. Lee is a past national president of the A.I.E. and a member of the A.S.M.E., I.R.E., and I.S.A. He is also a past chairman of the Engineers' Council for professional development.

Shown with Mr. Lee at the meeting are C. J. HENDON, vice president, General Electric Company, Atlanta; JOHN M. RITTELMAYER, president RITTELMAYER & COMPANY, Atlanta, and current president of the Georgia Engineering Society; and R. H. JACKSON, district sales manager of G.E.'s Atlanta, Georgia, office.

Plastic Pipe at Pecos, Texas

Here is **CONTINENTAL CAN COMPANY**'s butyrate pipe, a product of the Mills Plastic Pipe Division, going into an underground cable conduit installation at Pecos, Texas. The use of this extruded plastic pipe means an immediate 80% time savings for the Community Public Service Company doing the job.

Continental's plastic pipe filled two important requirements of this installation, ideally—it is light, easy and convenient to handle and it withstands strong alkali soil perfectly. Twenty-foot lengths of 4-in. pipe, weighing only 20 lb each, were deposited at the site. Put into place easily, they were quickly joined by solvent welded fittings and, when buried, will remain unaffected by the corrosive soil indefinitely.



Editor's Note: The quarter-of-a-mile 3" tenite butyrate pipe recently installed by Carolina Power and Light Company at their Wilmington, N. C. station operates at 50 psi and conducts corrosive water. For details, check **SP&I** for March, pages 50 and 51.

(Continued on page 114)

FUTURE EVENTS

Of Engineering Interest

THE RICE INSTITUTE EXPOSITION OF ENGINEERING, SCIENCE, AND ARTS, Albert Bundermeyer, Gen. Mgr., P. O. Box 1892, Houston, Texas. **April 2-3**, Fourteenth Biennial Exposition, Rice Institute, Houston, Texas.

8TH ANNUAL INDUSTRY-FACULTY CONFERENCE, Paul C. Koons, Jr., Acting Asst. Dir., Engineering Experiment Station, Louisiana State University, Baton Rouge 3, La. **April 6-7**, Conference, "Education and Industry," Louisiana State University, Baton Rouge, La.

2ND ANNUAL INSTRUMENTATION CONFERENCE, C. H. Edwards, Jr., Chm. Pub. Comm., Louisiana Polytechnic Institute, Ruston, La. **April 8-9**, Conference, Louisiana Polytechnic Institute, Ruston, La.

ILLUMINATING ENGINEERING SOCIETY, A. Dexter Hinckley, Exec. Sec'y, 51 Madison Ave., New York 10, N. Y. **April 8-9**, Southern Regional Conference, Roosevelt Hotel, New Orleans, La. **April 11-12**, Southwestern Regional Conference, Rice Hotel, Houston, Texas.

SOUTHERN INDUSTRIAL WASTE CONFERENCE, Sponsored by Manufacturing Chemists Assn., Maurice P. Cross, Jr., Sec'y, Woodward Bldg., Washington 5, D. C.; Southern Assn. of Science & Industry; and Texas Chemical Council. **April 21-23**, Conference, Hotel Shamrock, Houston, Texas.

AMERICAN SOCIETY OF TOOL ENGINEERS, Harry E. Conrad, Exec. Sec'y, 10700 Puritan, Detroit 21, Mich. **April 26-30**, Ninth Biennial Exposition Convention Center, Philadelphia, Pa.

AMERICAN WELDING SOCIETY, Joseph G. McGrath, Sec'y, 29 West 39th St., New York 18, N. Y. **May 4-7**, Second Welding & Allied Industry Exposition, Memorial Auditorium, Buffalo, N. Y.

SOUTHEASTERN ELECTRIC EXCHANGE, John Tally, Sec'y, Haas Howell Bldg., Atlanta, Ga. **May 6-7**, Engineering and Operation Section, Sans Souci Hotel, Miami, Fla.

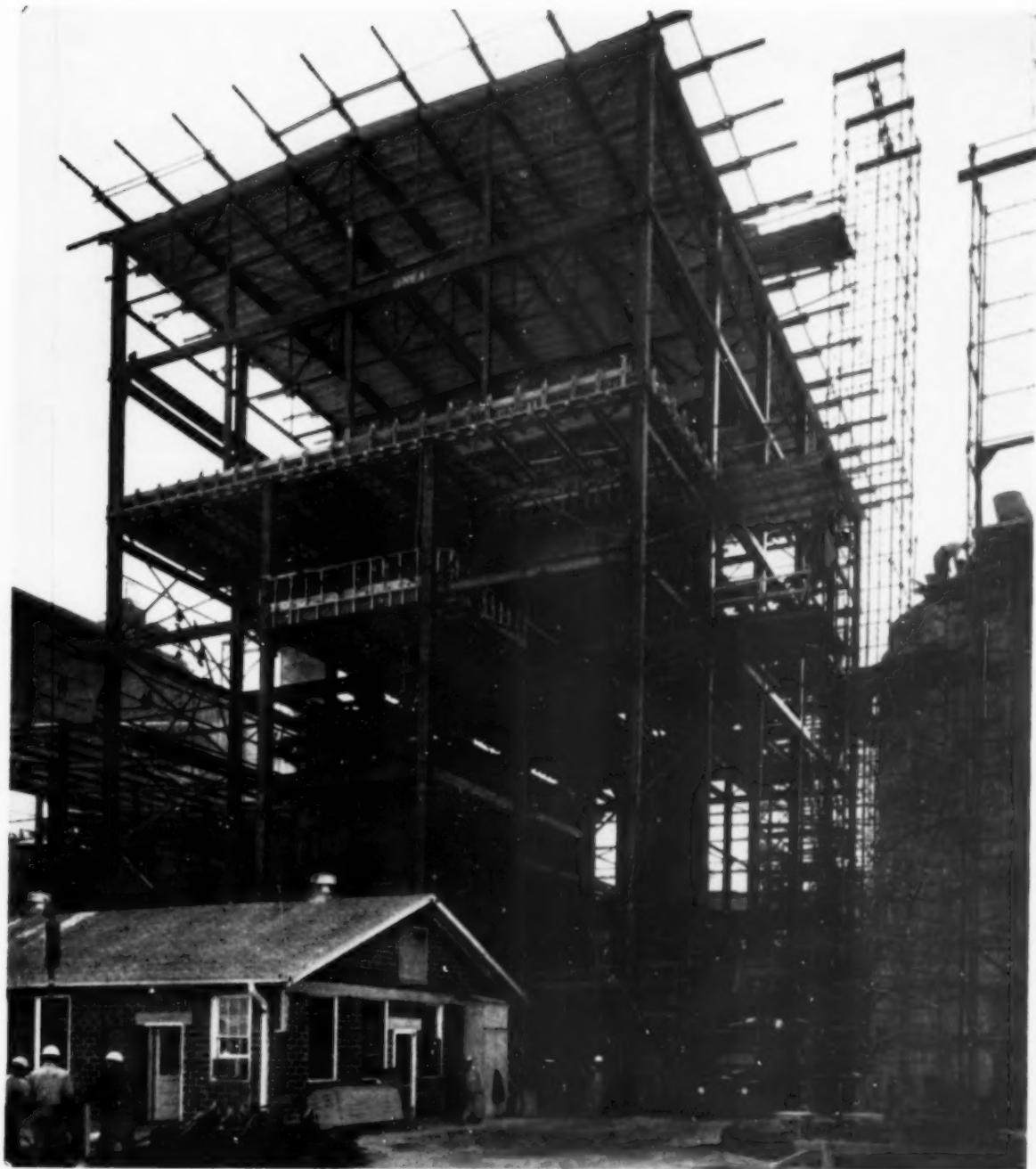
BASIC MATERIALS EXPOSITION, Clapp & Polink, Inc., 341 Madison Ave., New York 17, N. Y. **May 17-20**, Basic Materials Exposition and Conference, International Amphitheatre, Chicago, Ill.

WORLD TRADE INSTITUTE, World Trade Committee, Houston Chamber of Commerce, Houston, Texas. **May 17-20**, First World Trade Institute, University of Houston, Houston, Texas.

OLD TIMERS CLUB OF THE OIL BURNER INDUSTRY, H. A. MacCubbin, Sec'y, 126 W. Madison St., Villa Park, Ill. **May 18**, Annual Meeting and Dinner Party, Philadelphia Rifle Club, 7th & Tabor Road, Philadelphia, Pa.

THE SOCIETY OF THE PLASTICS INDUSTRY, INC., Wm. T. Cruise, Exec. V. P., 225 Madison Ave., New York 17, N. Y. **June 6-11**, Sixth National Plastics Exposition, Cleveland Auditorium, Cleveland, Ohio.

INSTRUMENT SOCIETY OF AMERICA, Managing Director, First International Instrument Congress & Exposition, 845 Ridge Ave., Pittsburgh 12, Pa. **Sept. 13-21**, First International Instrument Exposition, Philadelphia Convention Hall, Philadelphia, Pa.



Going up rapidly! This is the addition to the plant of the St. Regis Paper Co., Cantonment, Fla., the new Bleach Plant. O'Neal fabricated the 550 tons of structural steel.

O'NEAL STEEL WORKS

Birmingham 2, Ala.



NOW! another new* Anaconda program to help you...

INCREASE

**WHO WILL BENEFIT from
The FULL POWER AHEAD Plan
and... HOW?**

CONSUMERS

THE FARMER

The farmer will benefit from the use of power electric power to operate his farm more efficiently. It will cut the cost of his electric power production, and more power will be available for his farm equipment and more power will be available for his home.

THE URBAN HOUSEHOLDER

The householder will be able to afford more of the comforts of modern living. He will be able to afford more power for his home, more power for his car, more power for his refrigerator, more power for his television set, more power for his clothes washer, and more power for his clothes dryer.

SMALL INDUSTRY

The small business man will be able to afford more power and more efficient methods of doing his business. He will be able to afford more power for his office, more power for his factory, more power for his warehouse, and more power for his transportation equipment.

The increase in the use of electric power will be reflected in an increase in power sales. At the same time, it will result in a reduction of service costs made necessary by more power and other changes.

THE ELECTRICAL INDUSTRY

THE CONTRACTOR

The electric contractor will profit directly and immediately from the new money available to him that will enable him to construct more power producing projects for his customers and to increase his own production.

The type of money available to him can be used profitably in increasing his own production, for his customers' use in increasing their own production.

THE DISTRIBUTOR

This group will benefit from an increased demand for all materials and services used in electrical wiring. In addition, it will help to expand the market for other types of electrical equipment used by the distributor.

THE UTILITY COMPANY

An increase in ability to make full use of electric power will be reflected in an increase in power sales. At the same time, it will result in a reduction of service costs made necessary by more power and other changes.

Now, recheck the benefits you'll get through co-operation in this Plan to promote FULL POWER AHEAD.



For the UTILITY

A substantial increase in domestic, commercial, and power sales, and a reduction in service costs.



For the DISTRIBUTOR

Increased sales of materials and devices used in electrical wiring, and expanding markets for other types of electrical equipment.



For the CONTRACTOR

A substantial increase in wiring and other business which, in addition to being profitable in itself, provides jobs to keep construction crews busy or between bigger jobs.

Let's all get going—together—for better business through
FULL POWER AHEAD!

A. E. C. POWER & LIGHT COMPANY
ATLANTA, GA.

YOUR KWHR SALES

to

- **HOMES**
- **F FARMS**
- **SMALL INDUSTRIALS**
- **COMMERCIAL ENTERPRISES**

"REWIRE NOW!" is theme of new **FULL POWER AHEAD** Campaign. **FREE** sales literature is ready to help you promote full and more efficient use of electrical power... build load.

It's here now! Ready to lend a helping hand to electric power companies who want to encourage greater consumption of power in their territory. Anaconda's new **FULL POWER AHEAD** Campaign is all set to help you show your customers how to leap over the road block of inadequate wiring. Here's an effective way to educate commercial enterprises, industry, farmers, and homeowners how to make full, *unrestricted* use of electrical power. Logical result is to build profitable load for you... and cut down service calls from fuse blowouts and other outages!

FREE sales aids

Samples of suggested letters for mailing to your customers are ready now. Each "beats the drum" for wiring modernization... makes your customers more receptive to the efforts of distributors and contractors. These mailings, prepared especially for you,

can, of course, be supplemented by any campaign already being sponsored by the cooperating utility.

How to sell the modernization hold-outs

The standard excuse for not rewiring is "can't afford it!" THE **FULL POWER AHEAD** kit shows how to break through this sales resistance by taking advantage of property improvement loans under FHA Title 1. Just as this has helped others clinch sales, it can help get your customers to rewire now! It's another good reason to get your complete kit.

How to join the **FULL POWER AHEAD** Campaign

The Anaconda District Sales Office in your area can supply you with all campaign promotional material... give you full information about the new **FULL POWER AHEAD** Plan. Many contractors

and distributors have started their mailings. Tie in your promotion with theirs... and watch your kwhr sales grow. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.*

54412

INCREASE SALES OF POWER TO LARGE INDUSTRIALS, TOO!

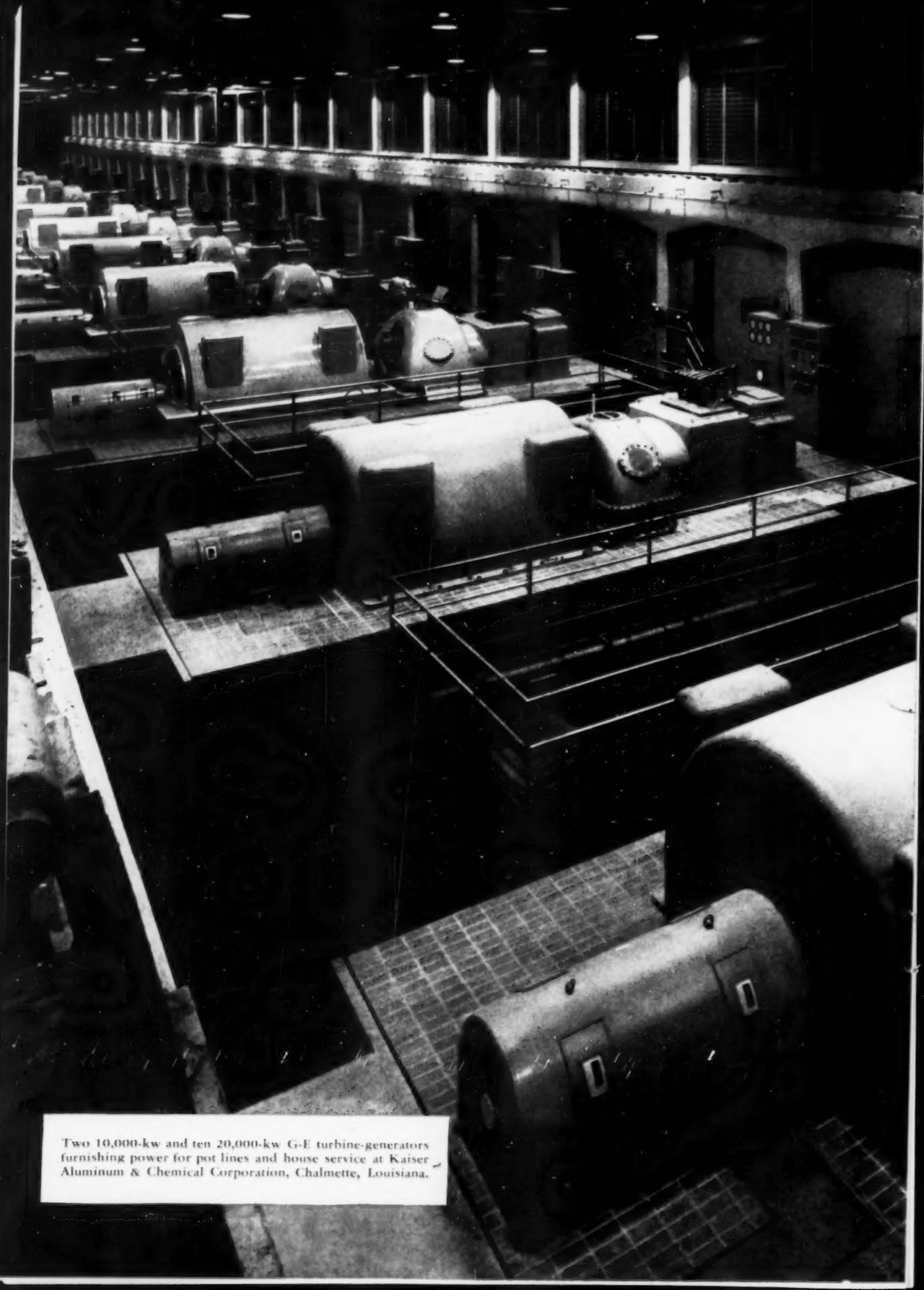
Anaconda has reactivated its successful **POWER-UP** Campaign. This plan tells industrial plant executives that **THERE NEVER WAS A BETTER TIME THAN NOW TO MODERNIZE THEIR PLANT WIRING SYSTEMS**. Your Anaconda District Sales Office has the complete story. Investigate today!

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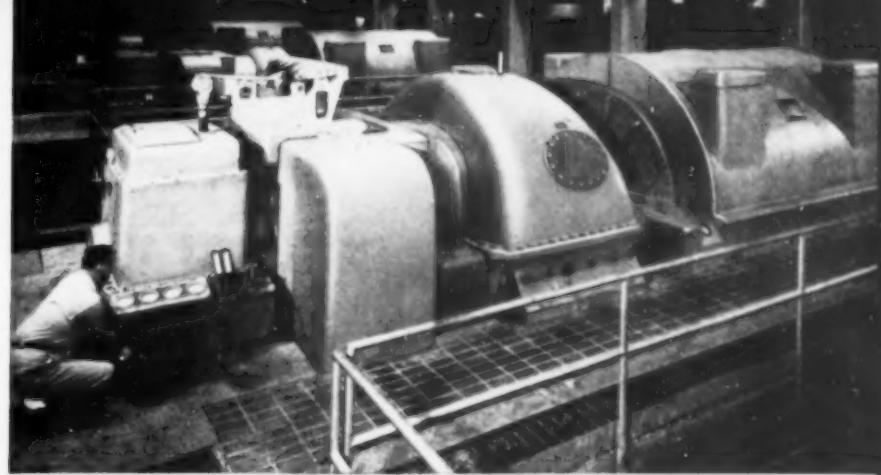
Primary and secondary distribution cable

- building, machine tool, control and communication wire
- portable cords and cables
- bus-drop cables
- apparatus cables
- copper, aluminum, copperweld conductors
- wire and cable accessories

*Once again Anaconda takes the lead in industry-wide promotion. 1936 - Industrial Modernization. 1941 - Preventive Maintenance. 1946 - Wire Ahead. 1950 - Power-Up - And Be Prepared. 1953 - Full Power Ahead.



Two 10,000-kw and ten 20,000-kw G-E turbine-generators furnishing power for pot lines and house service at Kaiser Aluminum & Chemical Corporation, Chalmette, Louisiana.



G-E Service Engineer making final inspection of 20,000-kw G-E turbine-generator at Kaiser Aluminum & Chemical Corporation. Two 10,000-kw units in background furnish power for house service.

Kaiser Aluminum Operates Sixteen G-E Turbines in Huge New Plant

KAISER ENGINEERS SELECT G-E TURBINES FOR QUICK DELIVERY; 12 UNITS FURNISH POWER FOR POT LINES; FOUR OTHERS SUPPLY ALL PLANT SERVICES.

When Kaiser Engineers planned the new Kaiser Aluminum and Chemical Corporation plant at Chalmette, Louisiana, they were faced with needing large blocks of power, at specified times, as each pot line was ready to produce aluminum. General Electric turbine-generators were selected, and two 10,000-kw and fourteen 20,000-kw units were ordered because they could be built and installed on time—ready to produce power on schedule.

Six pairs of turbine-generators will deliver 240,000 kw of power to the pot lines. Four other G-E turbines furnish power for all plant services and provide stand-by power.

ENGINEERS WORK TOGETHER

General Electric engineers worked closely with Kaiser Engineers as they do with all companies to achieve over-all project co-ordination on the installation of turbines, switchgear, transformers, rectifiers, etc.

Why not call in G.E.'s experienced engineers to explain the advantages of General Electric equipment in your next turbine installation. If your plant uses quantities of steam, check the economies of G-E automatic-extraction turbines used to supply low-pressure process steam and economical by-product power. Get more for your turbine dollar with G-E turbine-generators. General Electric Co., Schenectady 5, N. Y. 256-6

You can put your confidence in—
GENERAL  ELECTRIC

Now! . . .

An INTERRUPTING RATING in EXCESS of 100,000 AMPERES for *every set of fuse clips in your plant . . .* simply by installing **FUSETRON dual-element FUSES**

In 1947 tests made by the Electrical Testing Laboratories of New York, showed that on a circuit set to deliver 50,000 amperes, FUSETRON fuses in all tests cleared the circuit safely.

50,000 amp. Interrupting Capacity in 1947
becomes

100,000 amp. Interrupting Capacity Today

After years of intensive development work on FUSETRON fuses new tests were conducted under conditions that simulated the most severe field conditions and these tests were witnessed and verified by the Electrical Testing Laboratories of New York.

On circuits set to deliver in excess of 100,000 amperes, 30 to 600 ampere, 250 and 600 volt FUSETRON dual-element Fuses on each and every test cleared the circuit without belching flame or venting hot gases and with comparatively little noise.

Oscillograms of these tests interpreted by the Electrical Testing Laboratories, showed that the total available amperes including the direct current component, reached values as great as 165,000 peak amperes on 240 volt tests and as high as 212,000 peak amperes on the 535 volt tests.

This indicates that an interrupting rating of 100,000 amperes for FUSETRON dual-element fuses is a conservative one.

No interference with time-lag

In the development work to increase interrupting capacity in FUSETRON fuses it was kept in mind that the time-current characteristic must be maintained. Time-lag is of utmost importance to give proper motor and electrical protection and to eliminate needless blowing of fuses.

Remarkable results have been achieved. Interrupting capacity has been greatly increased while the time-current characteristic of FUSETRON fuses has in no way been disturbed.



FUSETRON is a trademark of the Bussmann Mfg. Co., Division of McGraw Electric Co.

Play Safe - install Fusetron Fuses throughout the entire electrical system!

Think!...

**ALL THIS ADDED SAFETY
without changing a panelboard
or switch... plus 10 Point Protection
of FUSETRON dual-element FUSES!**

Maximum Safety

With FUSETRON Fuses there is no cascading of interrupting rating — no places where an excessive fault current might cause serious damage. Every FUSETRON fuse has an interrupting rating in excess of 100,000 amperes.

You don't have to worry about selecting chosen spots in which to *pay extra* for "safe" equipment. Wherever a FUSETRON fuse is installed you have safety as sure and dependable as you can buy — no matter what you pay.

No Maintenance Costs

When FUSETRON fuses have once been installed properly you can forget about them. They need no periodic inspections to see if they will operate safely.

Dust, fumes, corrosion or age cannot prevent a FUSETRON fuse from opening safely. There are no hinges, pivots or contacts to stick or slow down the operation of the fuse on short-circuit.

With FUSETRON fuses — you get safety — without one cent spent for inspection or maintenance costs.

No Recalibration Costs

When a FUSETRON fuse does blow, there is no recalibration needed. As quickly as the fault in the circuit is corrected, you slip in a new fuse that has been CALIBRATED AT THE FACTORY BY ENGINEERS — a fuse that is as safe and dependable as the one that blew.

**for SAFE PROTECTION on loads
above 600 and up to 5000 Ampere
install BUSS Hi-Cap FUSES**

Tests have shown that BUSS Hi-Cap fuses have unlimited interrupting capacity on circuits of 600 volts or less.

They are designed to give protection against dangerous overloads as well as high fault currents — yet their speed of operation on heavy shorts limits currents to safe values. This minimizes damage to equipment and cuts down dangerous stresses on transformers.

When coordinated properly with FUSETRON dual-element fuses they will not open ahead of the fuses nearest to the fault. Thus trouble is isolated to the part of the circuit in which the fault occurs.

Added SAFETY on Old Installations

On installations where the increase in the capacity of the circuit has outgrown the interrupting rating of the circuit breakers, BUSS Hi-Cap fuses offer a safe and relatively inexpensive way to protect inadequate breakers against rupture in event of a bad fault.

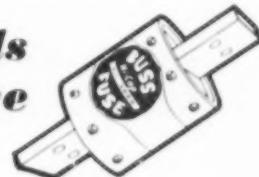
Bussmann Mfg. Co., University at Jefferson, St. Louis 7, Mo. Division McGraw Electric Company

SOUTHERN POWER & INDUSTRY for APRIL, 1954



PLUS 10 POINT Protection with FUSETRON dual-element FUSES

- 1 Protect against short-circuits.
- 2 Protect against needless blows caused by harmless overloads.
- 3 Protect against needless blows caused by excessive heating — lesser resistance results in cooler operation.
- 4 Provide thermal protection — for panels and switches against damage from heating due to poor contact.
- 5 Protect motors against burnout from overloading.
- 6 Protect motors against burnout due to single phasing.
- 7 Give DOUBLE burnout protection to large motors — without extra cost.
- 8 Make protection of small motors simple and inexpensive.
- 9 Protect against waste of space and money — permit use of proper size switches and panels.
- 10 Protect coils, transformers and solenoids against burnout.



ACTION THAT SAVES YOU MONEY

By passing the word along that all purchase and stock records should call for FUSETRON fuses on loads up to 600 amps—and BUSS Hi-Cap fuses on loads above that — you get action that begets money saving.

For blowing time charts or more information on FUSETRON Fuses and BUSS Hi-Cap Fuses write for Bulletins FIS and HCS.

WHERE TO GET IT



-INDEX OF HELPFUL BOOKLETS, BULLETINS, REFERENCE LITERATURE-

Cooperating with leading manufacturers of equipment and supplies, SPI makes available for the asking without cost or obligation, the following valuable bulletins, booklets, handbooks and catalogs.

Check the list, fill in Coupon, mail to SOUTHERN POWER & INDUSTRY. (Coupon Post Cards on pages 17 and 18.) This service restricted to those interested in the operation or design of Industrial, Power and Service Plants.

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18 STEAM GENERATOR—Bulletin SP-1—Profusely illustrated, describes the fully automatic Amesteam generator, available in sizes from 10 to 500 hp, and pressures from 15 to 299 psi—for oil or gas firing—AMES IRON WORKS.

21 DUST COLLECTORS, STACKS—Catalog 119—Describes the efficient combination of fans, breeching, stack and dust collector, in three main types to cover all service conditions, well proven in widespread use—PRAT DANIEL CORP.

29 CONTINUOUS BLOW-OFF—Bulletin 8 pages—Gives the basic facts about boiler blow off, and describes the Madden system of control of continuous blow-off for the removal of solids and impurities from steam releasing surfaces—THE MADDEN CORPORATION.

45 OIL BURNERS—Bulletin AD-102, 8 pages—Describes complete line of oil burners for industrial and commercial applications, giving specifications, illustrations, features and applications—CLEAVER-BROOKS CO.

50 BOILER-BURNER PACKAGE—Form 2314—Tells the story of the Kewanee-Iron Fireman boiler-burner package for automatic firing with gas, oil or a combination of the two fuels—IRON FIREMAN MFG. CO.

59 SPREADER STOKERS—Bulletin SB-31 gives complete details on the design, application and operation of spreader stokers which burn a wide range of coals efficiently and economically, and result from over 100 years of steam generating equipment manufacture—ERIE CITY IRON WORKS.

FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

106 BLOWERS AND FANS—Bulletin 12-R-53—Describes Montgomery Blower fans and centrifugal blowers, particularly intended for material handling. These are extra heavy, high efficiency fans and blowers to handle the most difficult jobs of air and materials movement—JACKSONVILLE BLOW PIPE CO.

122 FAN EQUIPMENT—Catalog 515—Covers Clarage portable ready units, complete "package" fans for light-duty ventilating and industrial service. 18 sizes available, capacities 100 to 12,000 cfm—CLARAGE FAN COMPANY.

127 GENERAL FANS—Bulletin T-158—A general catalog—describes company's complete line of fans, including large commercial and industrial type fans designed to properly ventilate plants and other enclosures, and increase morale and efficiency—THE EMERSON ELECTRIC MFG. CO.

169 FORCED DRAFT FANS—Bulletin 300, 8 pages—Describes features of the Prat-Daniel forced draft fans of new design, explaining the split wheel design for four way diffusion—THE THERMIX CORP.

174 LOW PRESSURE EVAPORATORS—Bulletin, 12 pages—Describes various types of evaporator plants—film type, high pressure and low pressure submerged tube types—the advantages of each type and its various equipment and the engineering details of Conesco single-effect and multiple effect evaporators—CONDENSER SERVICE & ENGINEERING CO. INC.

181 RECIPROCATING PUMP—Bulletin 239—Illustrates and describes popular Warren "Realwear" horizontal duplex piston pumps with cup packed pistons and durable valves. Adapted to boiler feed, fuel oil pressure, oil transfer, general water and other such services—WARREN STEAM PUMP CO.

INSTRUMENTS—METERS CONTROLS—REGULATORS

218 FUEL CUT-OFFS—Brochure D2—Describes electrode type equipment for installation on water columns to provide fuel cut-offs, high and low water level alarms and pump cut-in and cut-off, for pressures to 1100 psi—RELIANCE GAUGE COLUMN CO.

224 TEMPERATURE REGULATORS—Bulletin 6-A—Describes hydraulically and pneumatically operated temperature regulators for hot water heaters, tanks, process equipment—ATLAS VALVE CO.

239 REMOTE READING GAGES—Catalog 8 pages—Shows complete line of remote reading gages and accessories. A simple design transmits movement changes in mercury filled manometer, with illuminated scale, with accuracy to $\frac{1}{2}\%$ of scale reading—JERGUSON GAGE & VALVE CO.

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PLANT EQUIPMENT—WELDING TOOLS—PROCESS SPECIALTIES

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345 TANKS AND VESSELS—Bulletin describes the facilities and products developed through sixty years of manufacture and erection of steel tanks and pressure vessels, smoke stacks, breechings, boilers, and the like for Southern industry—J. J. FINNIGAN CO., INC.

357 MODERN LUBRICATION—Bulletin—Describes methods of modernizing with Manzel lubricators—pumps and compressors, wood and steel working machinery, pressure production and handling equipment—MANZEL, DIVISION OF FRONTIER INDUSTRIES, INC.

378 WROUGHT IRON—General Catalog—Contains complete technical information on all Byers products, a discussion of the differences between wrought iron and steel, a section on specifications, pipe standards and measurements, and how to order tubular products—A. M. BYERS COMPANY.

385 PLEXIGLAS PRODUCTS—Sample card gives standard outdoor and indoor Plexiglas colors and standard thicknesses for many applications—AMC SUPPLY DIVISION OF AIR ACCESSORIES, INC.

390 CASINGS AND PANELBOARD—Booklet F3, 37 pages—Depicts plant and equipment for producing breechings, casings, panel boards and other items of steel fabrication up to $\frac{1}{2}$ " thickness. Profusely illustrated with representative photographs of products—THE KIRK & BLUM MANUFACTURING COMPANY.

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410 PIPE HANGERS—Bulletin 158, 13 pages—Describes National counter-poise pipe hangers for high temperature piping systems in steam plants, refineries, chemical plants, and the like. Graphs give aid in selection. Dimensions, erection and field adjustment instructions. Illustrations of typical installations—NATIONAL VALVE & MANUFACTURING COMPANY.

428 PIPE HANGERS AND SUPPORTS — Catalog 51, 98 pages—A valuable collection of data on pipe hangers, vibration eliminators and supports, for particular use of those who buy, specify or design piping systems for industrial, power, utility and process plants. Catalog available when requests include title and connection.—POWER PIPING DIVISION, BLAW-KNOX CO.

435 INTEGRAL SEAT VALVES — Catalog 12-G1—8 pages—Describes Edward Univale integral seat all-purpose forged steel valves, rated from 1500 and 2500 lb. Complete material specifications and engineering details. Include Globe univales ideal for blow-off service and Check type univales of spring loaded piston design, in sizes from $\frac{1}{2}$ " to 1".—EDWARD VALVE, INC.

436 SPRAY NOZZLES — Bulletin 6N-617, 20 pages—Describes the Tarway inverted nozzles for spray cooling ponds and smaller involute and flat spray nozzles for industrial processing—for water cooling, air conditioning and general industrial uses.—YARNALL-WARING CO.

444 PRESSURE REDUCING VALVES — Bulletin 228, 8 pages—Describes and illustrates No. 338 pilot operated pressure reducing valves including illustrations, cutaway views, installation diagrams, tables of capacities and other information. Data on associated equipment.—MCLEAR MANUFACTURING COMPANY.

456 BRONZE TO BRONZE UNIONS — Bulletin D-255—Describes and gives list prices for Dart malleable iron unions with true ball joint bronze seats. Other types of Dart unions not illustrated.—THE FAIRBANKS COMPANY.

462 VALVE SELECTION — Catalog Reference Digest—Concentrates all pertinent facts about the most popular types of bronze, iron, cast steel and forged steel OIC valves. Gives pressure, temperature ratings, trim charts, recommended service—a quick desk reference.—THE OHIO INJECTOR COMPANY.

468 INDUSTRIAL THERMOSTATIC STEAM TRAPS — Bulletin 162—Describes 5 types for every power, heat, process application; pressures to 325 lbs. A comprehensive reference on advance-type drainage methods; piping diagrams; data for selecting proper size of trap.—W. H. NICHOLSON & CO.

491 CONTROL VALVES — Catalog 1500-8, illustrated—Describes complete line of Domotor, solenoid-operated and handwheel single seat control valves for handling difficult fluids under extremes of temperature and pressure. Offers full, unrestricted flow, positive plug and seat alignment and directional flow flexibility.—THE ANNIN COMPANY.

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503 MAINTENANCE CLEANING — Oakite Maintenance Manual, 30 pages—Gives complete details on over seventy essential maintenance cleaning jobs, and how they should be handled.—OAKITE PRODUCTS, INC.

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517 TUBE INSERTS — Bulletin, 8 pages—Describes the design, application and accomplishments of metal inserts or wearing strips for the inlet ends of tubes in condensers, heat exchangers, etc.—CONDENSER SERVICE & ENGINEERING CO., INC.

535 BLOWERS AND EXHAUSTERS — Bulletin A-559—Describes a complete line of multistage centrifugal blowers and exhausters built for applications which require air pressure from 1 to 9 lb per sq. in., or vacuum from 3 to 12 inches of mercury—designed to deliver air at uniform pressure regardless of variations in volume.—U. S. HOFFMAN MACHINERY CORP.

565 CONTROLLED LUBRICATION — Service Handbook, 56 pages—Describes the Lubriplate film and how its application arrests progressive wear, protects machinery, cuts down costs, and serves diversified applications in industrial, utility and service plants.—LUBRIPLATE DIVISION, FISKE BROS. REFINING CO.

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Equipment and Review Editor

SOUTHERN POWER AND INDUSTRY

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265	269	304	306	309	333	346	357	378	385	390	410	428	435	436	444	456
462	468	491	503	510	517	535	565	576	584	602	611	618	633	647	685	702
708	750	756	757	768	796	810	833	841	848	861	883	885	906	931	951	956
959	992	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15
P16	P17	P18														

Also send further information on following New Equipment (page 102)

D-1 D-2 D-3 D-4 D-8 D-9 D-10 D-11 D-12 D-13 D-14 D-15 D-16

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Company Name

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City Zone State

units, spiral-bevel units and helical-spiral-bevel units. Gives construction and operating details, with illustrations and selection data.—PHILADELPHIA GEAR WORKS.

750 WATER SOFTENERS AND DE-ALKALIZERS—Bulletin 3418, 18 pages—Describes the double duty, Zoo-Karb water softener and dealkalizer, giving typical water analyses before and after treatment.—THE PERMUTIT CO.

758 HEATERS, DEAERATORS AND HOT PROCESS SOFTENERS—Bulletin No. 163 describes the Belco exclusive atomizing valve available in capacities of 1 to 2,000 gpm. Belco open heaters, deaerators and hot process softeners are also illustrated and described.—BELCO INDUSTRIAL EQUIPMENT DIVISION.

757 DEMINERALIZATION—Bulletin—Describes the principles of demineralization of water for process and boiler feed applications—explains the chemistry and various processes and equipment used. Tables, diagrams, installation views.—GRAVER WATER CONDITIONING CO.

768 STEAM HUMIDIFIERS—Bulletin No. 1775, 12 pages—Explains electric and air operated units which introduce steam into atmospheres to bring humidity up to desired level. Selection, installation, prices, diagrams.—ARMSTRONG MACHINE WORKS.

796 WATER TREATMENT—Bulletin 51, 8 pages—Lists 94 Naico products by number and describes briefly their composition and use—lists principal industries using such products and typical applications in these industries.—NATIONAL ALUMINATE CORP.

ELECTRICAL

810 MOTOR STARTING SWITCHES—Bulletin 469—Describes a manually operated snap switch with thermal overload device for small motor application. Meets 1947 NEC ruling.—ALLEN-BRADLEY CO.

833 BRONZE BEARINGS FOR MOTORS—Catalog 152—Gives complete specifications of stock bronze bearings particularly intended for application to electric motors.—THE BUNTING BRASS & BRONZE CO.

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848 ELECTRIC MOTORS—Catalog, 28 pages—Describes the history of Sterling Electric Motor products, and gives details concerning design, applications and outstanding features.—STERLING ELECTRIC MOTORS CO.

861 FUSETRON FUSES—Booklet—Gives complete facts on Fusetron dual-element fuses, a combination fuse and thermal cut-out of low electrical resistance and high time lag—prevents shut-downs, saves maintenance costs.—DUSSMANN MFG. CO.

883 AERIAL CABLES—Bulletin K-1864, 8 pages—Describes the physical and electrical characteristics of self-supporting aerial cables with aluminum conductors. Complete engineering information and ca-

pacity tables. Prepared for consulting and industrial engineers and for utilities.—THE OKONITE COMPANY.

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MISCELLANEOUS . . . SAFETY, BUILDING EQUIPMENT, METALS

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931 VACUUM CLEANING—Form A-712 pictures a wide variety of plant cleaning and production jobs, through illustration of typical plants, done by Hoffman vacuum cleaning equipment.—U. S. HOFFMAN MACHINERY CORP.

951 ENGINEERING SERVICES—Catalog 0-94-001, including a special equipment section, describes qualifications for designing, engineering and construction of plant and processing facilities for Chemical and Petroleum industries.—J. F. PRITCHARD & CO.

956 SWIMMING POOL EQUIPMENT—Bulletin WC-102—Describes a complete line of swimming pool equipment, including filters, chemical feeders, sterilizers, hair and lint catchers, pool cleaners, re-circulating pumps, heaters, fittings and accessories—dimension, capacity and other tables.—GRAVER WATER CONDITIONING COMPANY.

959 THERMAL INSULATION—Chart IN-6D, 11 1/2 in. x 15 in., suitable for hanging on the wall, shows at a glance the recommended insulation for every temperature range, from minus 400°F to plus 2000°F.—JOHNS-MANVILLE CORP.

992 FIRE PROTECTION—Bulletin 2319 describes Blaw-Knox Deluge systems, wet and dry pipe sprinkler systems, water spray and fog systems, rate-of-rise sprinkler systems, etc., and indicates how a sprinkler system pays for itself out of insurance savings.—BLAW-KNOX SPRINKLER DIV., BLAW-KNOX CONSTRUCTION CO.

Continued on page 132

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462 468 491 503 510 517 535 565 576 584 602 611 618 633 647 685 702
708 750 756 757 768 796 810 833 841 848 861 883 885 906 931 951 956
959 992 P1 P2 P3 P4 P5 P6 P7 P8 P9 P10 P11 P12 P13 P14 P15
P16 P17 P18

Also send further information on following New Equipment (page 102)

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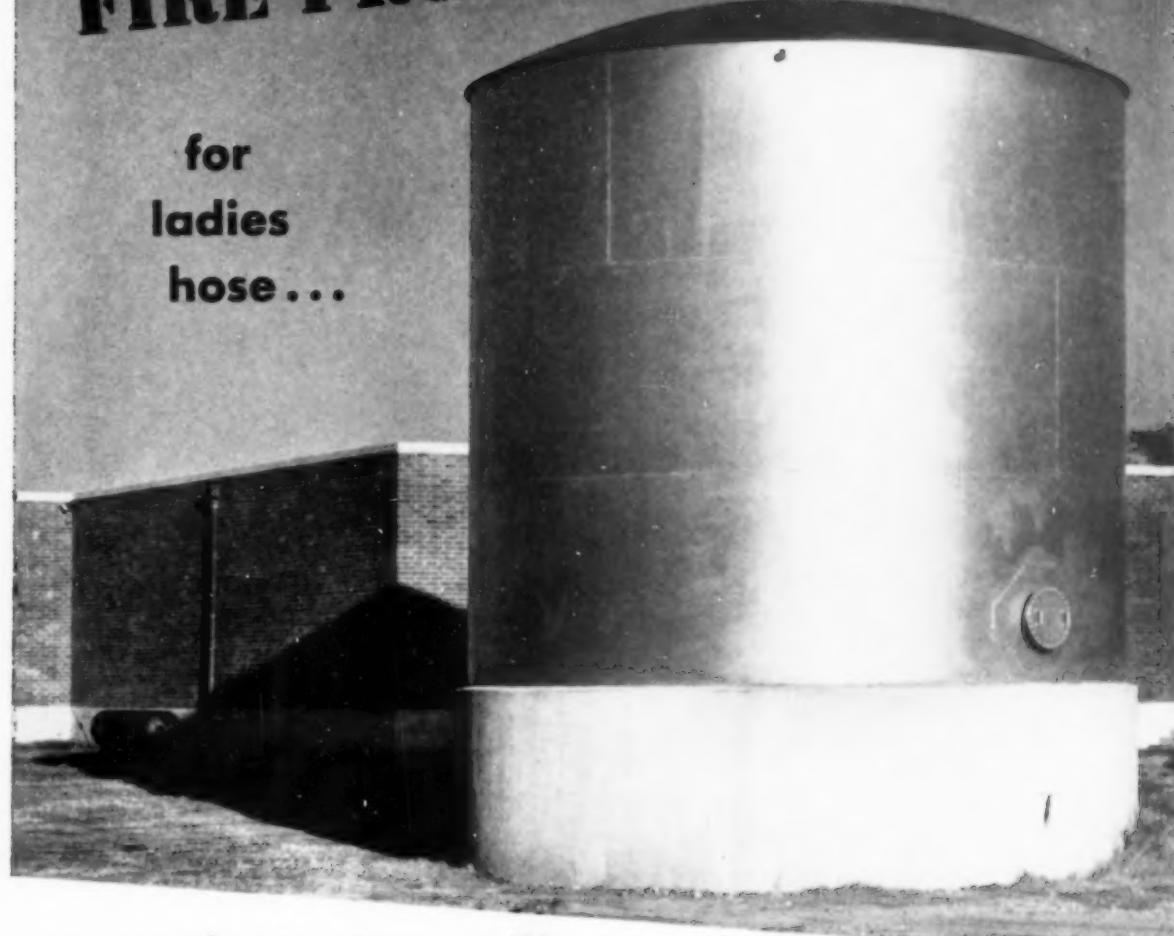


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hose . . .



manufacturing mills

The 100,000-gal. suction tank shown above was built by Chicago Bridge & Iron Company to provide the primary water supply for fire protection at the Belton Hosiery Mills in Belton, South Carolina. These mills, which are a subsidiary of Julius Kayser & Co., are leading producers of ladies full-fashioned hose.

To provide dependable protection, the tank provides suction for fire pumps connected to an automatic sprinkler system which fully covers the mills' 55,000 sq. ft. of floor space. This is the type of system that pays off in property protection and lower fire insurance premiums. The mill was built and the sprinkler system was installed by Daniel Construction Co.

To protect your own plant from the ever-present threat of fire, investigate the possibilities of a Horton suction tank or a Horton elevated water tank. Write our nearest office for estimates or quotations.

CHICAGO BRIDGE & IRON COMPANY

Atlanta 3..... 2180 Healey Bldg.
Birmingham 1..... 1331 North Fifth St.
Boston 10..... 1041—201 Devonshire St.
Chicago 4..... 2107 McCormick Bldg.
Cleveland 15..... 2210 Midland Bldg.

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA.

Detroit 26..... 1534 Lafayette Bldg.
Houston 2..... 2122 C & I Life Bldg.
Los Angeles 17..... 1545 General Petroleum Bldg.
New York 6..... 3312—165 Broadway Bldg.
Philadelphia 3..... 1646—1700 Walnut St. Bldg.

Pittsburgh 19..... 3252 Alcoa Bldg.
Salt Lake City 4..... 145 West 17th South St.
San Francisco 4..... 1511—200 Bush St.
Seattle 1..... 1345 Henry Bldg.
Tulsa 3..... 1628 Hunt Bldg.

In Canada—HORTON STEEL WORKS LIMITED, FORT ERIE, ONT.



A house for tomorrow

When Bill Miller first talked to the architect about his new home he stressed his desire to put into it the soundest materials and the newest conveniences.

"I hope my grandchildren will be happy in this house," he explained. "New improvements come fast these days, so let's try to be a few years ahead in our planning."

"What fuel would you like to use?" asked the architect when the discussion reached the heating plant.

"I would prefer to use coal," answered Bill, "I understand it is the most economical fuel here, as it is in most areas. But I don't want my wife

to be a furnace-tender."

"With a modern, bin feed stoker with thermostatic control," said the architect, "your heating will be completely automatic, as well as clean and convenient. And coal has some big advantages — it gives a steady heat, not an off-again-on-again heat. Then there's this for the fellow who looks ahead: I don't know how long these other fuels are going to last. Every year they have to drill their wells deeper, and we are becoming more and more dependent on foreign supplies. As these other fuels get scarcer, they are going to get even more expensive."

"But coal is another story. There is plenty of coal right here in the United States to last us for hundreds—maybe thousands of years. That's something to think about when you're planning a house with the hope that your grandchildren will still be living in it."



**Chesapeake and Ohio
Railway**

**Bring your fuel problems
to C & O**

As the world's largest carrier of bituminous coal, the C&O is intimately familiar with every phase of coal use. We have a large staff of experts who will gladly help you to locate the coal best suited to your needs; to help you use it most efficiently; to help get it to you promptly.

Write to:
Coal Traffic Department
Chesapeake and Ohio Railway
2112 Terminal Tower
Cleveland 1, Ohio



Ordinary rubber
can't handle OZONE

You need U. S. GRIZZLY Uskorona-insulated Power Cables

Here's an illustration showing how ozone can chew up a sturdy, rugged cable. This can never happen with United States Rubber Company's famous Grizzly® Power Cables insulated with Uskorona® compound which prevents electrical failure caused by ozone (Uskorona-1 oil base compound or Uskorona-2 butyl rubber compound). Uskorona meets (and in many ways exceeds) the applicable IPCEA specifications for ozone-resistant rubber insulation.

As the only wire manufacturer that grows its own natural



U. S. Grizzly Uskorona-insulated Power Cable, 5,000 Volts, type RR 3 conductor, shielded, Neoprene jacket.

rubber, produces its own synthetics and makes its own plastics (as well as the bulk of its own rubber-compounding chemicals and ingredients), United States Rubber Company is able to make certain that only the finest materials are used in the insulations for its wires and cables. These materials are expertly compounded according to methods devised after years of research and experimentation in "U. S." laboratories. Finally, U. S. Rubber's practical "know-how" contributes its important part to the uniform high quality of every "U. S." insulation. This "know-how" is the result of 68 years of successful manufacture of electrical wires and cables, and over a century in the making of fine rubber products.



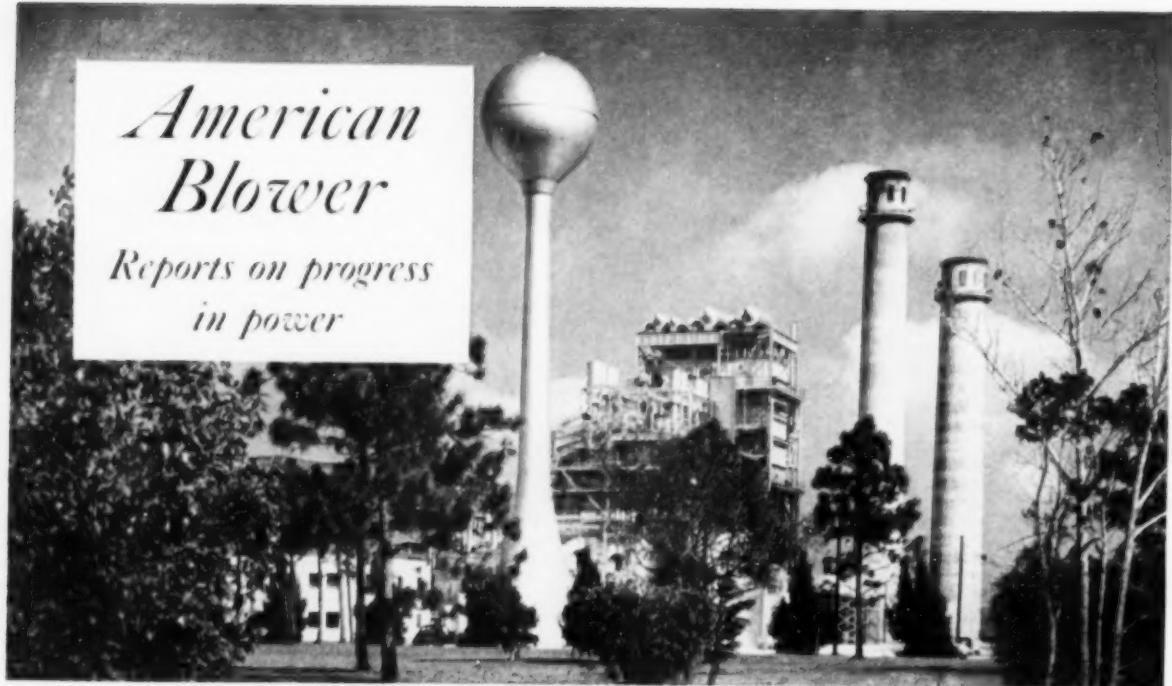
Send for free catalog giving
full information about U. S.
Electrical Wires and Cables



UNITED STATES RUBBER COMPANY
ELECTRICAL WIRE & CABLE DEPARTMENT ROCKEFELLER CENTER, NEW YORK 20, N. Y.

American Blower

*Reports on progress
in power*



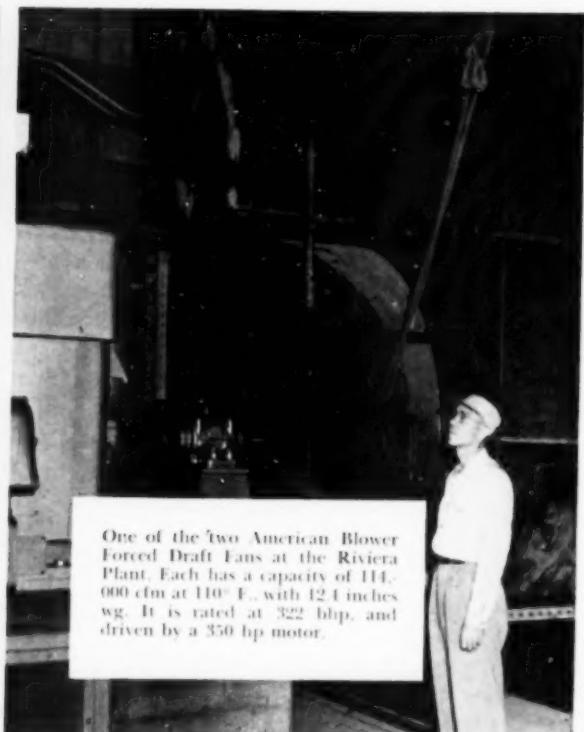
Florida Power & Light Company's beautiful Cutler Plant is the state's largest single generating plant. Its expansion

to 210,000 kw. in 1954 will help the rapidly growing power needs of the thriving Greater Miami area.

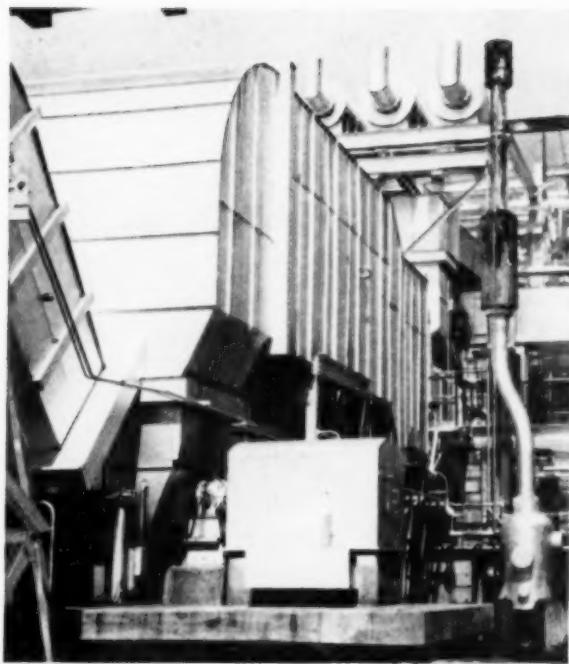
Power plants, like everything



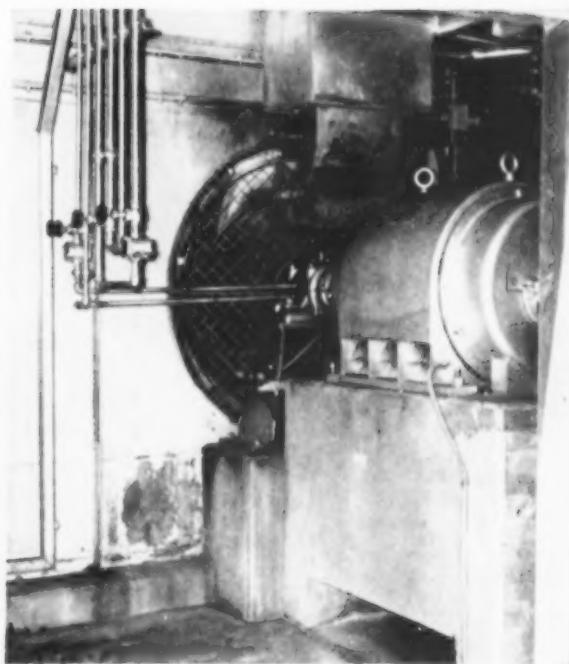
One of the Riviera Plant's American Blower Induced Draft Fans. It has a capacity of 160,000 cfm at 306° F., with 15.4 inches wg. It is rated at 566 bhp and driven by a 600 hp motor.



One of the two American Blower Forced Draft Fans at the Riviera Plant. Each has a capacity of 114,000 cfm at 110° F., with 12.4 inches wg. It is rated at 322 bhp, and driven by a 350 hp motor.



American Blower Induced Draft Fans at the Cutler Plant have a capacity of 68,000 cfm at 350° F., with 9.7 inches wg. Four ABC Fans serve the steam generators for two 15,000 kw. units.



Each of the American Blower Forced Draft Fans at the Cutler Plant has a capacity of 40,500 cfm at 100° F., with 8.7 inches wg. and is rated at 111 bhp and driven by a 150 hp motor.

else, expand fast in Florida!

In fabulous Florida, everything grows fast . . . industry, agriculture, population — and electric power!

Florida Power & Light Company, for instance, has added 10 new generating units since V-J Day . . . and more are coming. Generating capacity is up 212 percent, more than double the national average. With a giant 135,000 kw. plant scheduled for completion in 1955, F P & L's system capacity will total 877,000 kw., or more than four times its end-of-the-war figure.

The Company's Cutler Plant, just south of Miami, is Florida's largest — a model of "outdoor" plant construction, blending ideally with its semi-

tropical surroundings on the shores of picturesque Biscayne Bay.

American Blower products play a big part in F P & L's power progress. In the new 80,000 kw. unit at Cutler, two American Blower Induced Draft and two Forced Draft Fans are being installed. At the Company's new 80,000 kw. unit at the Riviera Plant near West Palm Beach, four similar American Blower Fans are already in service.

Are you planning to modernize or enlarge your facilities? Then get in touch with your nearest American Blower Branch Office (or write us direct) for full information on Mechanical Draft Fans, Dust Collecting Equipment and Gyrol Fluid Drives for boiler feed pumps and fan control.

AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN • CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO

Division of American Radiator & Standard Sanitary Corporation

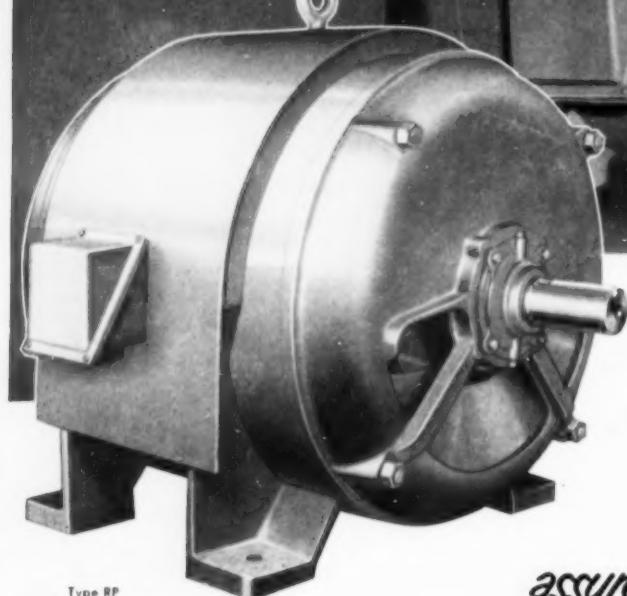
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Serving home and industry: AMERICAN STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • BOSS EXCHANGERS • SUNBEAM AIR CONDITIONERS

Wagner®

ELECTRIC MOTORS
...the choice of leaders
in industry

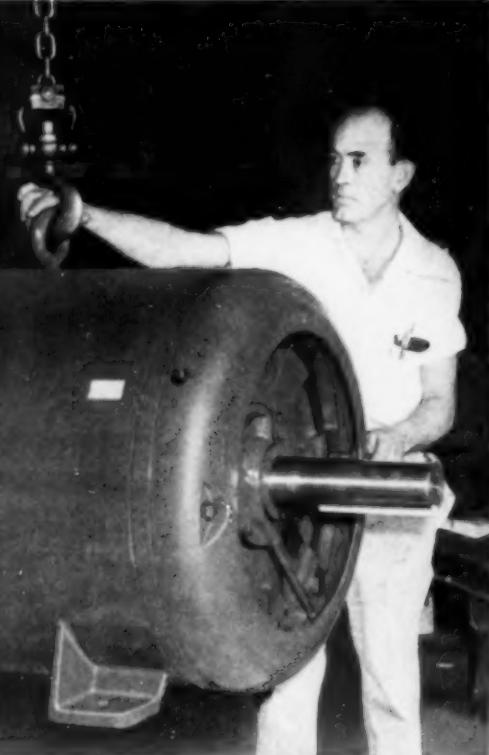
don't let
production
schedules lag!



Type RP
1/6-400 hp.

The Wagner line of general-purpose polyphase squirrel-cage motors, built for rugged industrial service, includes a "family" of open protected-type ratings through 400 horsepower. These motors are protected by a heavy steel frame, with ventilating openings at the bottom only, and by endplates of drip-proof design.

These Wagner Motors have the winding strength and the adequate ventilation required to stand the



Wagner totally-enclosed fan-cooled cast iron frame motor, completely protected from dust, dirt or corrosive vapors. Built in ratings from 2 to 250 hp. Also available in explosion-proof design.

Wagner Industrial Motors

assure continuity of motor operation

shock of starting heavy loads repeatedly and to operate continuously without exceeding their rated 40° C temperature rise.

* * *

A skilled Wagner engineer will be glad to help you select the correct motor for *your* specific application. Just call the nearest of our 32 branch offices, or write for Bulletin MU-185 for complete information.



MS4-9

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

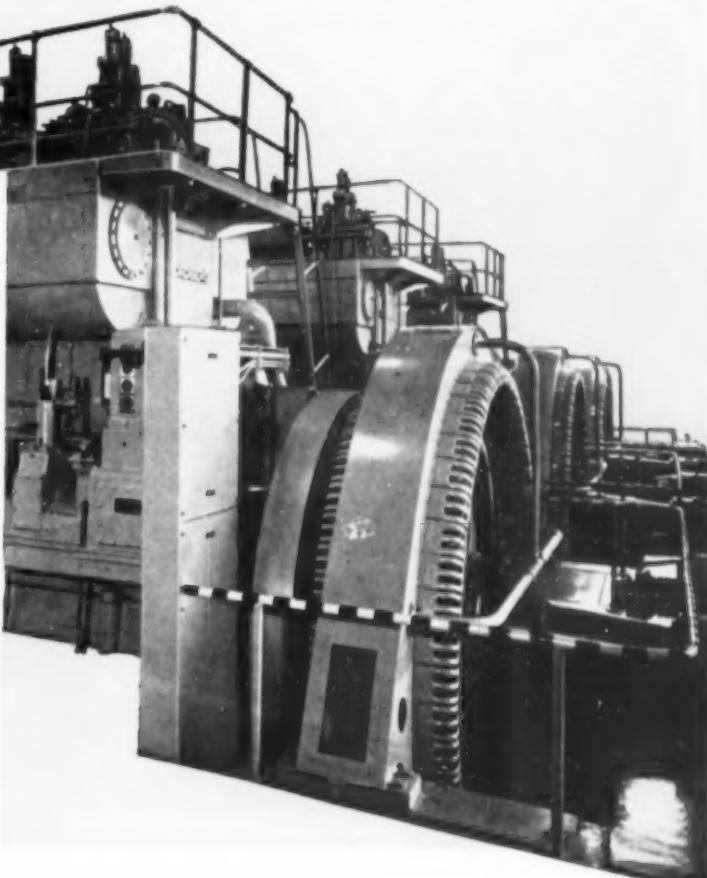
WAGNER ELECTRIC CORPORATION
6303 PLYMOUTH AVE., ST. LOUIS 14, MO., U.S.A.

ELECTRIC MOTORS
TRANSFORMERS
INDUSTRIAL BRAKES
AUTOMOTIVE
BRAKE SYSTEMS—
AIR AND HYDRAULIC

Shell Rotella Oil

Reduces
piston ring
and
cylinder wear

Saves
many dollars
in
costly
maintenance



These dual-fuel engines in the Municipal Power Plant at Houma, Louisiana, supply dependable, low-cost electric power to the entire city. Shell Rotella Oil is the cylinder lubricant.

Here's just one of the many diesel power plants that depend on **SHELL ROTELLA OIL** for reduced wear of engine parts . . . lower maintenance cost.

The anti-corrosive action in Shell Rotella Oil combats the major cause of engine wear . . . cylinder and piston ring wear caused by acid ac-

tion from the by-products of incomplete combustion and condensation.

Tougher lubricating film in Shell Rotella Oil gives cylinders and rings greater protection . . . minimizes wear. Its effective detergent-dispersant action prevents harmful deposits.

Write for technical information. See for yourself how Shell Rotella Oil can help reduce your engine maintenance costs.

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100 BUSH STREET, SAN FRANCISCO 6, CALIFORNIA



"We 'educated' our College Heating Plant...

**with a modern coal installation we saved
more than a third of our fuel bill,"**

says Mr. James Gribben, Chief Engineer of Bethany College, Bethany, West Virginia.



"Colleges watch operating costs as closely as any business firm—and one big item for our college is the heating bill.

That's exactly why Bethany went to the expense of putting in new coal heating equipment! Our old system supplied heat for sixteen buildings—to the tune of 2,600 tons of coal a year. Our new installation, with its automatic stoker, does the same job using only 1,650 tons. That's a fuel saving of 38.9%! Our eyes certainly have been opened to the efficiency and economy of *bituminous coal*—especially when it's burned with modern equipment."

Modern combustion installations can add anywhere from 10% to 40% to the energy obtained from the same amount of coal in years gone by. Great advances have been made in coal- and ash-handling equipment, too—cutting labor costs—making coal as clean and convenient to use as any fuel.

If you're planning to modernize your present installation—or thinking of building a new plant, call in a competent consulting engineer. He'll show you how a modern coal system designed to meet your specific needs can save you money and serve you better!

And don't forget—you'll always be able to get the coal you need. America's coal industry is the most efficient in the world. America's coal reserves are ample for centuries to come. Right now and for the future, too, coal users can be assured of a dependable fuel supply at reasonable prices.

BITUMINOUS COAL INSTITUTE

A DEPARTMENT OF NATIONAL COAL ASSOCIATION

Washington, D. C.



Here's Bethany's new boiler room, showing the pipe of the automatic stoker.

THIS MODERN EQUIPMENT WILL PAY FOR ITSELF, THROUGH FUEL SAVINGS ALONE, IN LESS THAN TWO YEARS!

If you're running your own steam plant—for heat or for power—you just can't afford to ignore these facts!

COAL in most places is today's most economical fuel.

COAL resources in America are adequate for all needs—for hundreds of years to come.

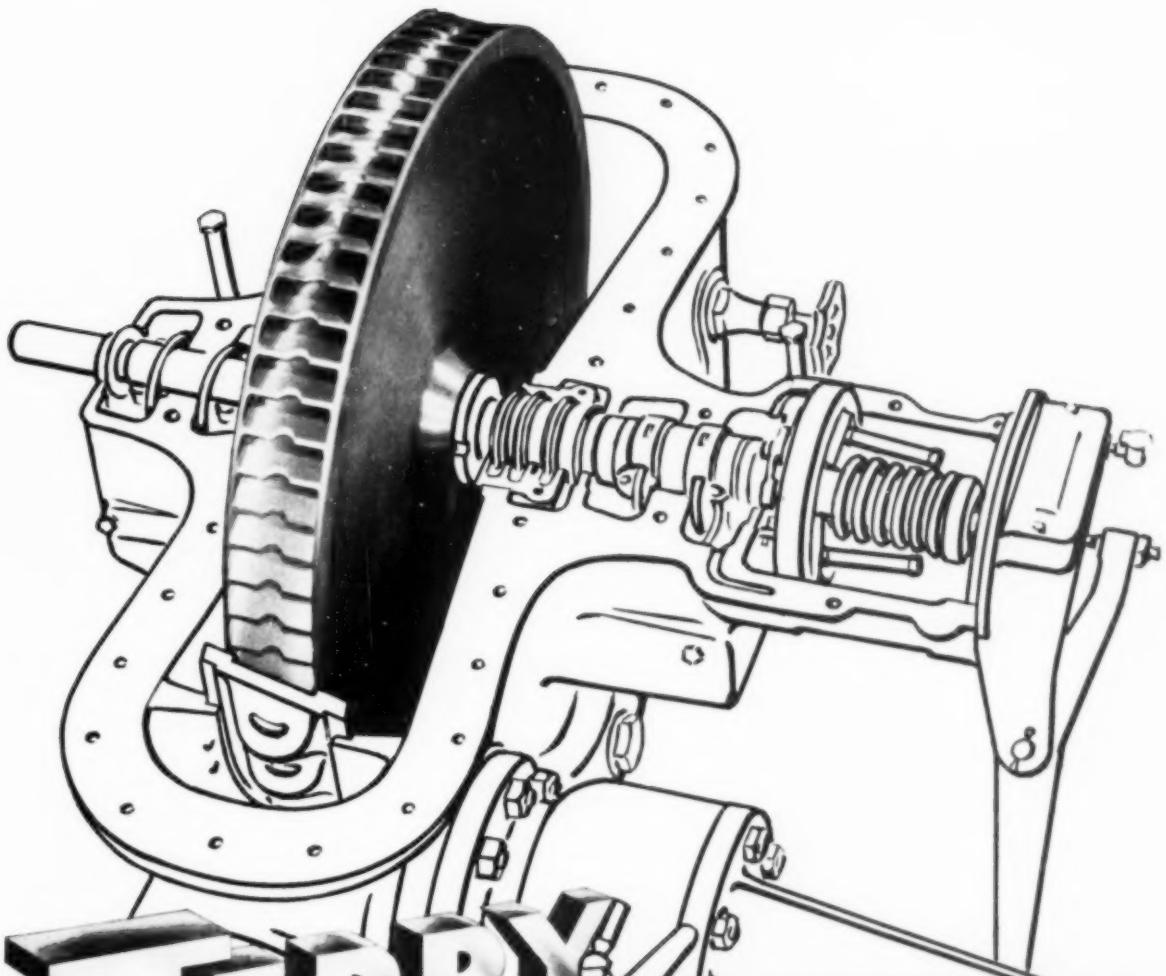
COAL production in the U.S.A. is highly mechanized and by far the most efficient in the world.

COAL prices will therefore remain the most stable of all fuels.

COAL is the safest fuel to store and use.

COAL is the fuel that industry counts on more and more—for with modern combustion and handling equipment, the inherent advantages of well-prepared coal net even bigger savings.

FOR HIGH EFFICIENCY & FOR LOW COST
YOU CAN COUNT ON COAL!



TERRY

SOLID WHEEL

RUGGEDNESS

is your turbine dividend

The rugged construction and fool-proof design of a Terry solid-wheel turbine can save you money by keeping maintenance costs to a minimum. Usually only taken down for routine inspection, any repairs that must be made are of relatively simple nature, and cost of replacement parts is small.

The rotor of the turbine is a single forging of special composition steel, in which a series of semi-circular buckets is milled. There are no separate parts to loosen or work out. As the only function of the blades is to form a series of pockets, any wear which might occur would not materially affect

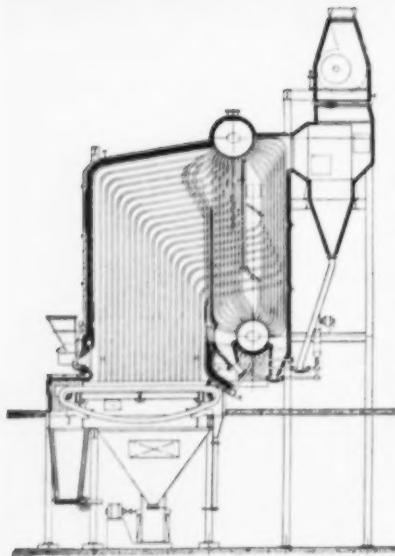
horsepower or efficiency.

It is impossible for the blades to foul. They have large clearances and are further protected by the projecting rims of the sides of the wheel. As the side clearances are also very large, end play can do no harm.

The Terry solid-wheel turbine is an extremely reliable piece of equipment—why not write for complete details today? Ask for a copy of Bulletin S-116.

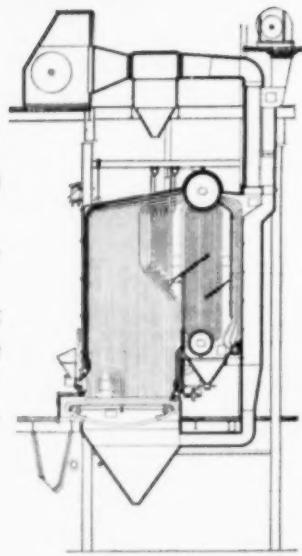
THE TERRY STEAM TURBINE COMPANY
TERRY SQUARE, HARTFORD 1, CONN.

TT-119B



MUNITIONS

No. Boilers . . (2)
 Capacity each 50,000 lbs./hr.
 Design Pressure 160 psig
 T. T. Steam 366 F
 Firing Erie City "Travagrate"



AUTOMOTIVE

No. Boilers . . (2)
 Capacity each 100,000 lbs./hr.
 Design Pressure 700 psig
 T. T. Steam 750 F
 Firing Erie City "Travagrate"

ERIE CITY'S 2-DRUM STEAM GENERATORS

Eric City . . . pioneer in the development of the 2-drum boiler and the application of water walls to furnace design . . . offers a complete, modern line of two, three, or four drum steam generators to solve your most complex problem.

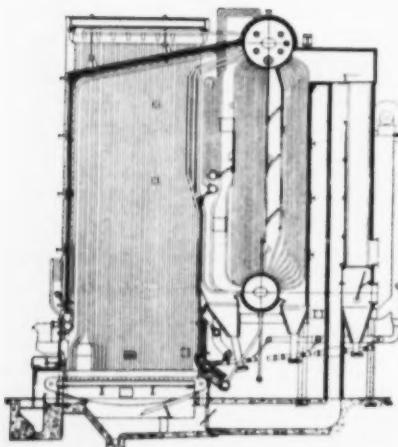
Installations such as shown here indicate the versatility of the Erie City 2-Drum steam generator. The wide range of sizes, adapted to all types of mechanical firing prove its adaptability to all classes of industry. The broad experi-

ence of Eric City qualifies it to combine proper boiler selection with efficient use of modern heat recovery equipment and proper application of firing equipment. Add to this the fact that Erie City steam generators are designed to include the best of modern utility standards and then you know . . . "YOU CAN DEPEND ON ERIE CITY FOR SOUND ENGINEERING" . . . is not just a statement. It is a positive fact that can prove to be of value and profit to you.



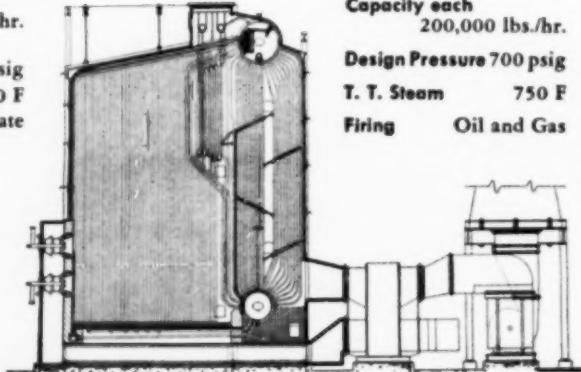
ERIE CITY IRON WORKS • Erie, Pa.

STEAM GENERATORS • SUPERHEATERS • ECONOMIZERS • AIR PREHEATERS
 UNDERFEED AND SPREADER STOKERS • PULVERIZERS



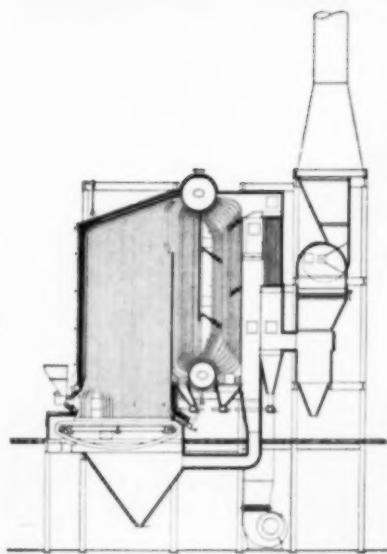
SUGAR

No. of Boilers . . (2)
 Capacity each 150,000 lbs./hr.
 Design Pressure 450 psig
 T. T. Steam 570 F
 Firing Traveling Grate



CHEMICAL

No. of Boilers . . (3)
 Capacity each 200,000 lbs./hr.
 Design Pressure 700 psig
 T. T. Steam 750 F
 Firing Oil and Gas



U.S. GOVERNMENT

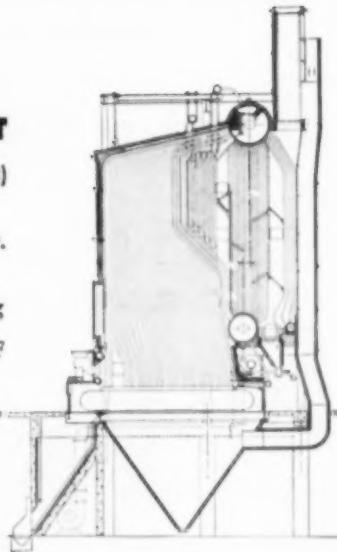
No. of Boilers . (3)

Capacity each
105,000 lbs./hr.

Design Pressure
200 psig

T. T. Steam 371 F

Firing
Erie City "Travagrate"



AVIATION

No. of Boilers . (8)

Capacity each
135,000 lbs./hr.

Design Pressure
475 psig

T. T. Steam 715 F

Firing Chain Grate

SATISFY BROAD DEMANDS

All Erie City 2-drum steam generators are equipped with contact type steam scrubbers. These scrubbers utilize reverse flow and contact with bare corrugated metal surfaces to insure moisture free steam at outlet.



PETROLEUM

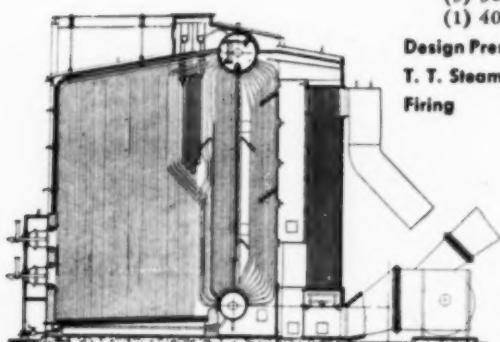
No. of Boilers . . (4)

Capacity each
(3) 300,000 lbs./hr.
(1) 400,000 lbs./hr.

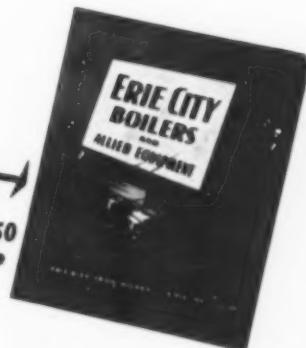
Design Pressure 725 psig

T. T. Steam 688 F

Firing Oil and Gas



GENERAL CATALOG SB-50
describes the complete line
of Erie City Boilers and
Allied Equipment.



THE ONE YOU WANT?



He has it!

NO NEED to search through directories or ask people about it. When you need a finished bearing, a bar of bearing bronze or any other one of countless items of industrial materials and equipment, just phone your industrial distributor.

YOUR BUNTING distributor is the leading industrial distributor, or a stock-carrying specialist in certain industrial items. With money-saving convenience, he can supply hundreds of different sizes of completely machined and finished Bunting Standard Stock Industrial Bearings, Electric Motor Bearings and Precision Bronze Bars.

Ask him
for a Bunting
Catalog which gives
complete dimensional
and technical data.

Bunting®

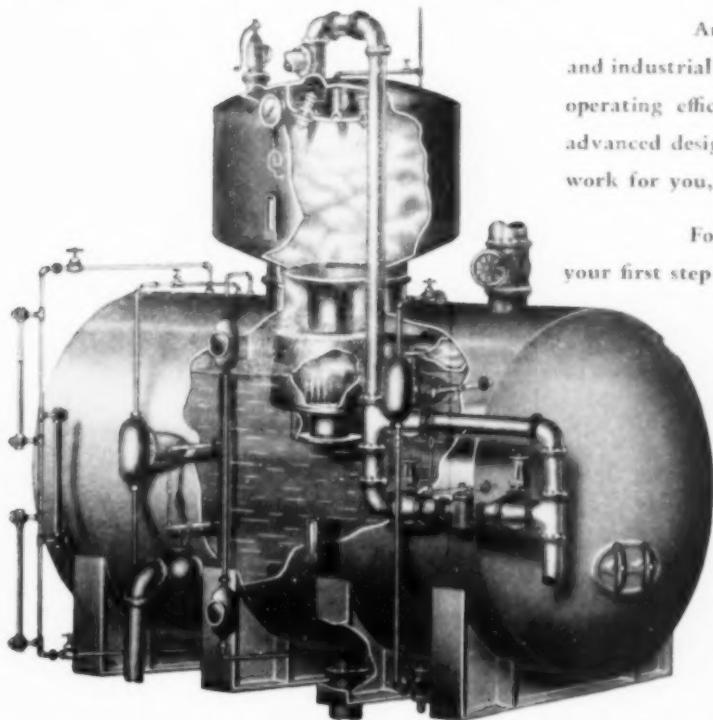
BRONZE BEARINGS • BUSHINGS • PRECISION BRONZE BARS



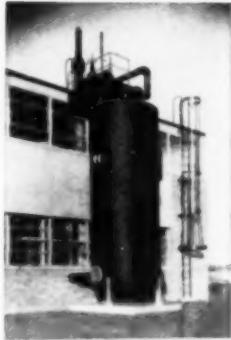
The Bunting Brass & Bronze Company • Toledo 1, Ohio • Branches in Principal Cities • Distributors Everywhere

In Deaeration, too

BELCO Builds a Complete Line-



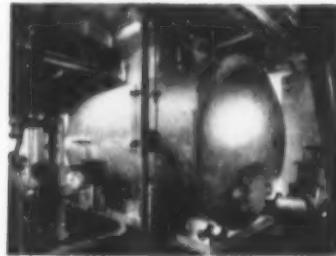
MARINE TYPE—Typical Belco marine heater furnished to shipyards. (Approved by Lloyds of London)



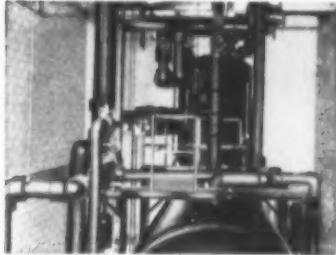
OPEN TYPE—Deaerator at large eastern pharmaceutical plant. Capacity of 80,000 lbs hr.



VACUUM TYPE—Unit shipped set-up to midwestern utility. Has 150,000 lbs hr capacity.



SPRAY TYPE—Belco Deaerator in large eastern oil refinery. Has a capacity of 300,000 lbs hr.



SPRAY TRAY TYPE—Belco Deaerator at New York State institution boiler house. Capacity 120,000 lbs hr.



TRAY TYPE—Belco Deaerator at southern municipality. Has a capacity of 125,000 lbs hr.

Boiler Feedwater Heaters • Water Softeners • Filters • Clarifiers
Demineralizers • Automatic Process Control Panels

BELCO INDUSTRIAL EQUIPMENT DIVISION, INC.

108 PENNSYLVANIA AVENUE, PATERSON 3, N. J.

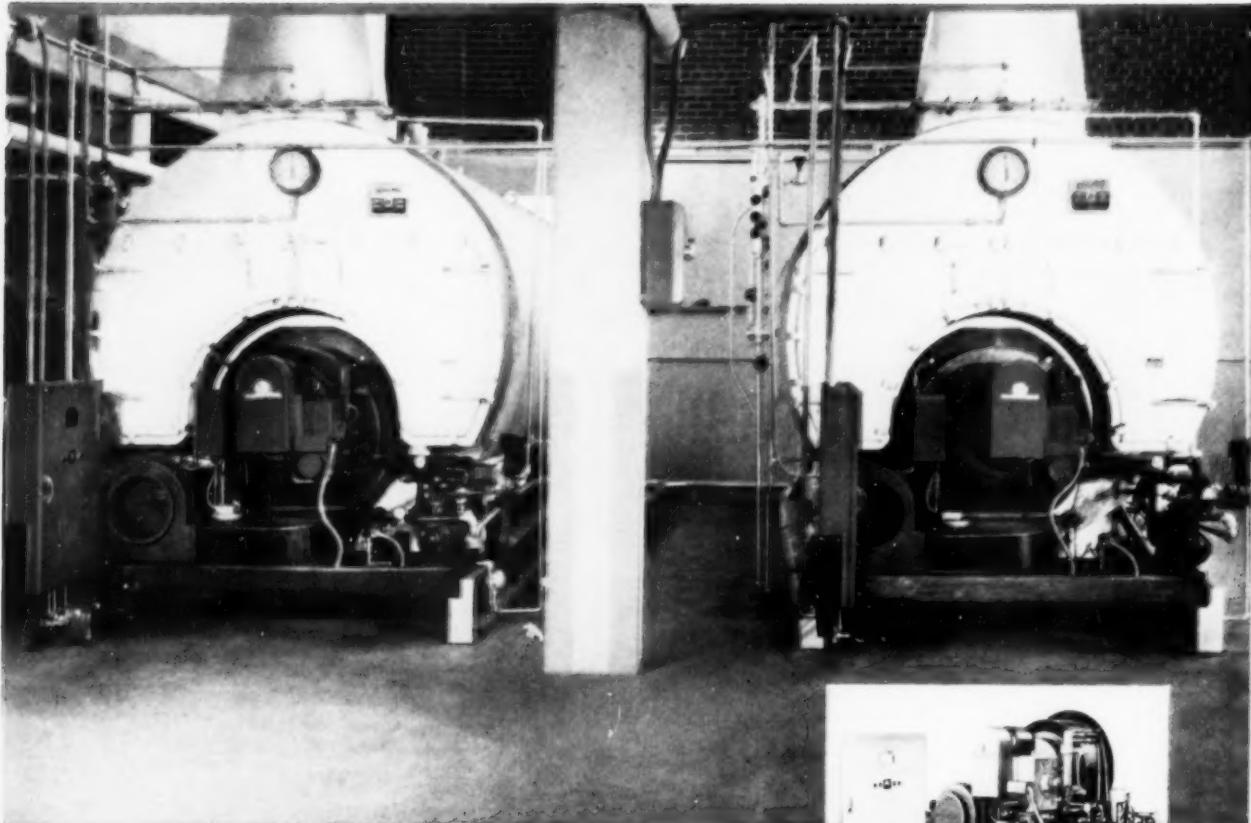
REGIONAL OFFICES: Philadelphia, Pa., Chicago, Ill., Houston, Texas
North Hollywood, Cal., Montreal, Que., Toronto, Ont.

Representatives in all principal cities of the United States and Canada

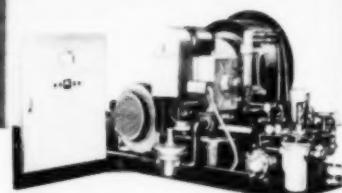
BELCO DESIGNS, ENGINEERS & FABRICATES WATER PROCESSING EQUIPMENT

"Packaged" for better firing at lower cost

Installation by Kirby-Hammond, Inc., Greenville, N. C. Race, Forrester & Elting, Architects and Engineers.



Iron Fireman packaged industrial oil burners integrated with Scotch marine type boilers in the plant of Belrug Mills, Inc., Greenville, South Carolina. At right, Iron Fireman oil-gas packaged unit. With this unit it is possible to switch fuels at any time, at a moment's notice.



Engineered as a single complete unit

This Iron Fireman package unit is much more than a conversion burner. It's a complete combustion system in which all elements are correctly balanced and integrated—a thoroughly engineered firing plant. It includes burner (for oil or gas or both), fuel system, forced draft air supply, control panel, and pre-formed refractory combustion throat. Installation requires little more than bolting the entire unit to the boiler front and making service connections for power and fuel.

To the user this means an attractive saving in installation time and cost. But even more important, it means a factory assembled and tested unit instead of a locally

assembled job. It means dependable performance and high operating efficiency, with substantial fuel savings. It's the *smart* way to modernize your boiler room.

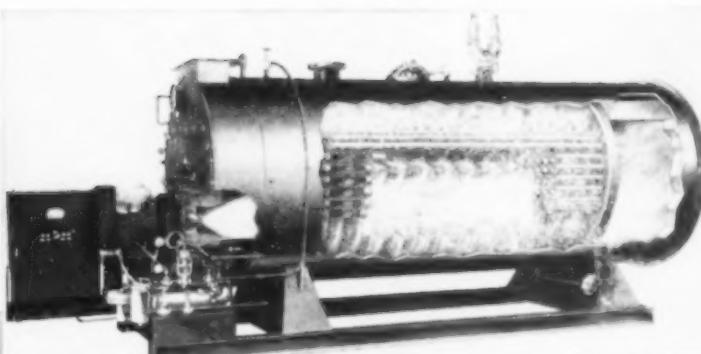
Get in touch with your Iron Fireman dealer, or mail the coupon on the opposite page for complete information.



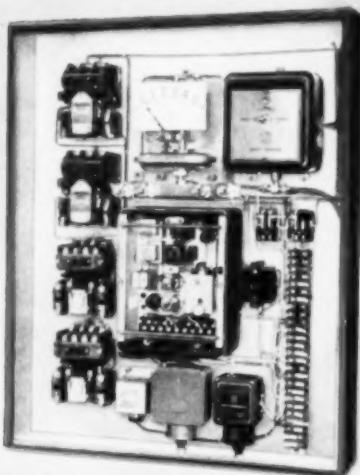
Iron

OIL, GAS AND COAL FIRING

OIL, GAS or OIL-GAS COMBINATION BURNER UNIT BY IRON FIREMAN



Cutaway view of packaged boiler-burner unit consisting of Scotch marine boiler with Iron Fireman combination Gas-Oil forced draft burner. The shift from one fuel to another is accomplished quickly, with no sacrifice in firing efficiency.



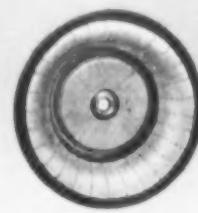
WIRED, TESTED CONTROL PANEL

Control panel is totally enclosed, with all instruments wired and tested at the factory. Entire wiring system is coded, with varicore wires and numbered terminal strip inside panel. An indicating meter on the panel door shows the condition of the control system at all times. Indicating lights on panel front show operating status of unit at a glance. Green lights show motors in service; red indicates safety lockout.



**IRON FIREMAN
ROTARY OIL BURNER**

The oil firing unit is the Iron Fireman rotary cup oil burner which has an outstanding record of reliability in precision firing of hard-to-handle heavy oils. Heart of the oil control system is the Iron Fireman Oil Volumeter, a variable volume metering pump submerged in the oil reservoir, which delivers the correct volume of oil to the burner head with extreme accuracy, regardless of changes in oil viscosity. Burns any grade of oil, from lightest to heaviest, without special adjustment.



**REFRACTORY
COMBUSTION THROAT**

The combustion throat, with pre-formed built-in refractory, is an integral part of the burner unit. Both primary and secondary air are admitted to the combustion chamber through this throat, eliminating the special brickwork required by the usual conversion burner and greatly improving the air-fuel mixture. Oil cup is in the center of the refractory disc, which also shields the gas jets against the radiant heat of the furnace. Adjustable inlet vanes control the shape and rotation of the flame to match the requirements of the firebox or firetube.

No divided responsibility

No separate contracts for (1) boiler setting (2) electrical wiring (3) oil heating equipment (4) automatic control system (5) forced draft system (6) boiler refractory.

You can install a complete new boiler plant quickly and economically by specifying an Iron Fireman packaged burner and a Scotch marine type boiler engineered specifically for use with this unit. Forced draft, no high stack required. Or you can install the Iron Fireman packaged burner in practically any type

of existing boiler, with important savings in installation and operating costs.

How to specify

First, decide what fuel or fuels you want to use (oil, gas or oil-gas combination). Second, determine the load. Third, refer to table in Iron Fireman catalog or specifications for the correct size of burner and boiler for your job.

For more information use the coupon below.

Iron Fireman Mfg. Co., 3050 West 106th Street, Cleveland 11, Ohio. In Canada, write 80 Ward Street, Toronto, Ontario.

Please send me literature giving full information on the Iron Fireman "packaged burner" unit.

Name _____

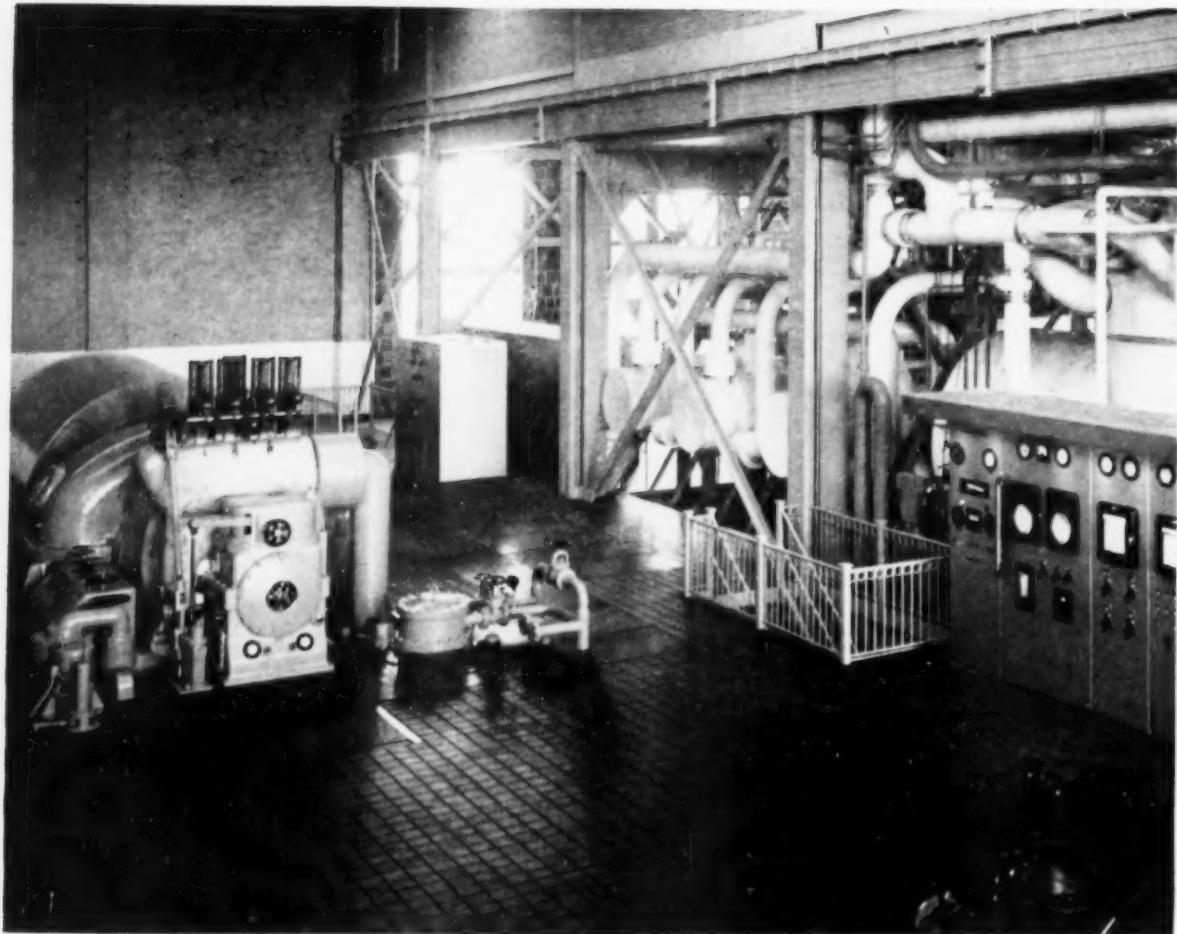
Address _____

City _____

State _____

Fireman

FOR HEATING, PROCESSING, POWER



You've Got To Be Good

AFTER 67 years service to southern industry, Standard Oil lubricants continue first in point of popularity. The reason is self-evident. To *stay* first, your product must be *better*, your service *superior*... The reputation for offering new lubricants to meet changing machinery needs has always been one of this company's attributes. The combined facilities for testing and research behind Standard Oil lubricants are unequalled. Wherever there are moving parts and friction in

your plant, there are special Standard Oil lubricants to afford *maximum* protection. Whatever your lubrication requirement may be, there's a Standard Oil lubricant "tailored" to fit your needs—designed to do your particular job with economy, dependability and efficiency.

Standard Oil Company
(KENTUCKY)





"You see POWELL VALVES everywhere!"

Not surprising when you realize that Powell makes more kinds of valves and has probably solved more valve problems than any other organization in the world. And this has been going on since 1846.

Wherever flow requires dependable control,

there's the place for Powell Valves—available through distributors in principal cities. Made 1 $\frac{1}{2}$ " to 30" and 125 pounds to 2500 pounds. W. S. P. Bronze, iron, steel and corrosion-resistant alloys. On problems, write direct to The Wm. Powell Company, Cincinnati 22, Ohio.

CONTROLS FOR THE LIFE LINES OF INDUSTRY



Powell Valves

*108th
year*

Maybe you're not from Missouri...



but let
BELL & ZOLLER
show you why

Superwashed

coals are the
best!

You will discover that Bell & Zoller's *Superwashed ORIOLE* is super-clean, a free burning, low ash, low moisture coal that is correctly sized to meet your specific requirements—to keep boiler efficiency *up* . . . steam costs *down!* Shipped economically from the No. 11 seam in Western Kentucky via rail or combined rail-inland waterway routes. We assure you of complete satisfaction . . . and stake our reputation on it!



BELL & ZOLLER COAL COMPANY

BELL BUILDING, CHICAGO 1, ILLINOIS
ST. LOUIS • LOUISVILLE • OMAHA • MINNEAPOLIS • TERRE HAUTE • MILWAUKEE
Sixty-Eight Years of Service to Coal Users

Producers of
**ZEIGLER, MOSS HILL,
ORIOLE, MURDOCK,
and BUCKHORN Coals**

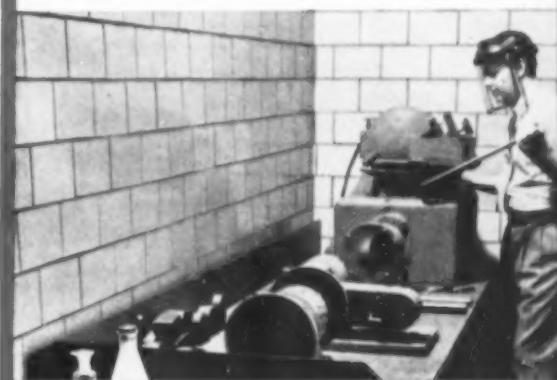
Sales Agents for
Otter-Creek-Eagle Coal Co.,
Lockwood, West Virginia
Spring Hill Mining Company
Terre Haute, Indiana
Boone County Coal Corporation
Sharples, West Virginia



◀ Heat-treating and physical testing equipment shown at left is used for quality control of welding operators and for development of new welding procedures.



▲ This Rockwell hardness testing machine measures the hardness of weld specimens as a guide to proper procedures for heat-treating of welds.



▲ A laboratory technician cuts a sample from a pipe weld prior to grinding and polishing for metallographic examination.



▲ Here a weld specimen is etched to outline the grain structure for further metallographic study.



NATIONAL VALVE & MANUFACTURING COMPANY

3106 LIBERTY AVENUE, PITTSBURGH 1, PENNSYLVANIA

New York • Chicago • Cleveland • Boston • Atlanta • Buffalo • Cincinnati

**Daily rigid testing
is your insurance of
quality welds in
NAVCO
FABRICATED
PIPING**

At Navco, a continuous parade of weld specimens are processed in the new, modern physical-chemical testing laboratory. It is here that weldments are studied metallographically and tested physically—all on a rigid schedule of quality control practices. Navco customers have benefited from progressive quality control practices for more than 40 years; they have come to know that piping installations, engineered, fabricated and erected by Navco, are precise, accurate and dependable.

Call on NAVCO for your next piping job.

Walworth's NEW small cast steel valves

SERIES 1500 — SIZES $\frac{1}{4}$ to 2 inches

handle { **HIGH** temperatures
HIGH pressures

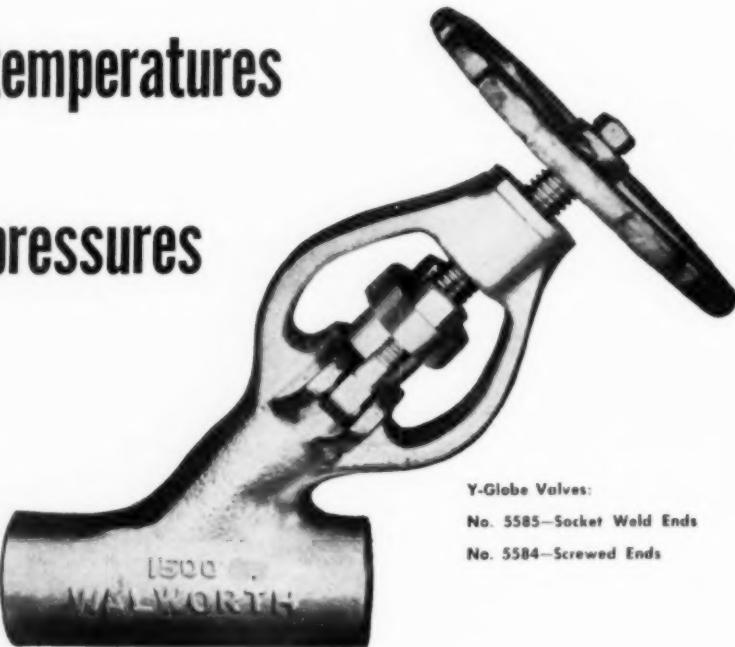
Walworth is proud to make these new Small Cast Steel Valves available to power stations . . . oil refineries . . . ships . . . wherever piping is subject to severe pressures and temperatures. Non-shock service ratings of these valves: 1500 psi-950F for steam; 3600 psi-100F for water, oil or gas. Cast of chromium molybdenum steel, they are compact and light, yet exceptionally strong. Both Y-Globe and Angle type valves are available.



Angle Valves:

No. 5587—
Socket Weld End

No. 5586—
Screwed End



Y-Globe Valves:

No. 5585—Socket Weld Ends

No. 5584—Screwed Ends

Simplified Walworth design eliminates many of the valve problems encountered in high pressure service. Among the features of this new valve are:

INTEGRAL BODY AND YOKE — made from a single casting without threading or welding. Bonnet joint — always a potential source of leakage — is eliminated. Valves can be reassembled quickly and easily.

ROTATING DISC — prevents valve seat distortion and consequent leakage. Cuts down replacements.

WELDED SEAT RING — compensates for changes in pressure and temperature—eliminates a major source of leakage.

SPECIAL BACK SEAT BUSHING — permits repacking the valve under pressure with greater safety.

PACKING CHAMBER — designed to dissipate heat thus keeping packing rings at lower temperatures—gives them longer life.

These valves are available with either socket weld ends or screwed ends, in sizes ranging from $\frac{1}{4}$ to 2 inches. For further information on Walworth series 1500 Small Cast Steel Valves, see your local Walworth distributor, or write for Circular No. 134.

WALWORTH
valves • fittings • pipe wrenches
60 EAST 42nd STREET, NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

...solid foundation

**FOR TODAY'S
COMPACT
MOTOR DESIGN**



There are, as you know, new NEMA Standards for electric motors ... more power in less space

When you look for a new NEMA frame motor, look for the one that is built on a solid foundation ... it carries the Fairbanks-Morse Seal of Quality.

The Standards are new... But the Idea Is Not

Like the recent Fairbanks-Morse developments in other lines, the new F-M motor is the result of a basic engineering philosophy: More Performance in Less Space—a 120-year tradition at Fairbanks-Morse. Fairbanks, Morse & Co., 600 South Michigan Avenue, Chicago 5, Illinois



FAIRBANKS-MORSE

a name worth remembering when you want the best

ELECTRIC MOTORS AND GENERATORS • DIESEL LOCOMOTIVES AND ENGINES • PUMPS • SCALES • RAIL CARS • HOME WATER SERVICE EQUIPMENT • FARM MACHINERY • MAGNETOS

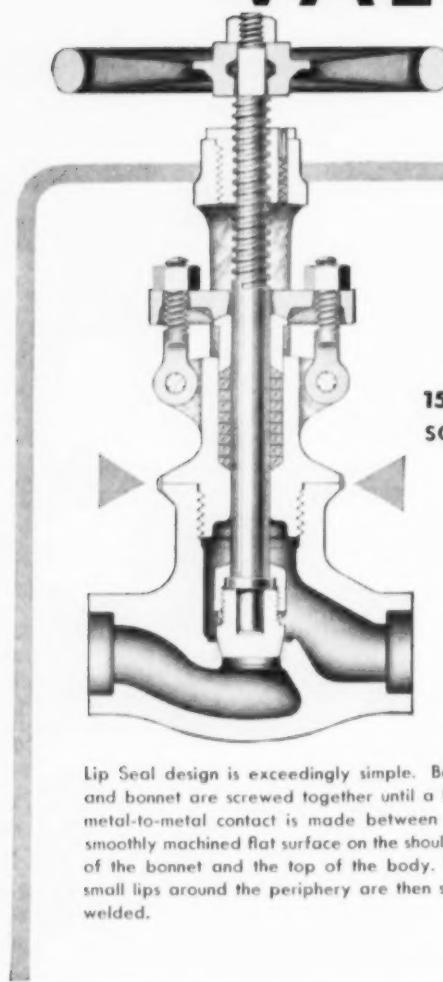


newest in small steel valves for high-pressure/high-temperature

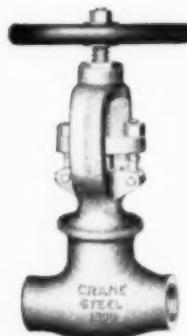
CRANE

lip-seal bonnet (patented)

VALVES



Lip Seal design is exceedingly simple. Body and bonnet are screwed together until a firm metal-to-metal contact is made between the smoothly machined flat surface on the shoulder of the bonnet and the top of the body. The small lips around the periphery are then seal welded.



- Absolute Bonnet-Joint Tightness
- Freedom from Bonnet-Joint Maintenance
- Minimum Weight and Bulk
- Easier Dismantling and Reassembly

1500 AND 2500-POUND GLOBE AND ANGLE PATTERNS SOCKET-WELDING AND SCREWED ENDS. SIZES $\frac{1}{2}$ TO 2-INCH

What better way to seal against leakage at the bonnet joint of a small steel valve... than with a simple weld. And that's all the weld is ever called upon to do. Extra-long body-bonnet threads carry all mechanical loads—and at comparatively low stresses. Should dismantling be necessary, the seal weld may be repeatedly ground off—and reapplied—without damage to valve.

Right along with this modern Crane sealing principle go other important refinements. You get a compact, weight-saving structure without sacrificing strength or reducing seat area—a more rigid swivel disc-stem connection—durable Stellite-faced plug-type disc—and Stellite-faced integral seat.

Crane Lip-Seal Bonnet Valves are by far your best buy for high-pressure/high-temperature power services... worthy companions to the larger Crane Pressure-Seal Valves. Ask your Crane Representative for Circular AD1902, or write direct.

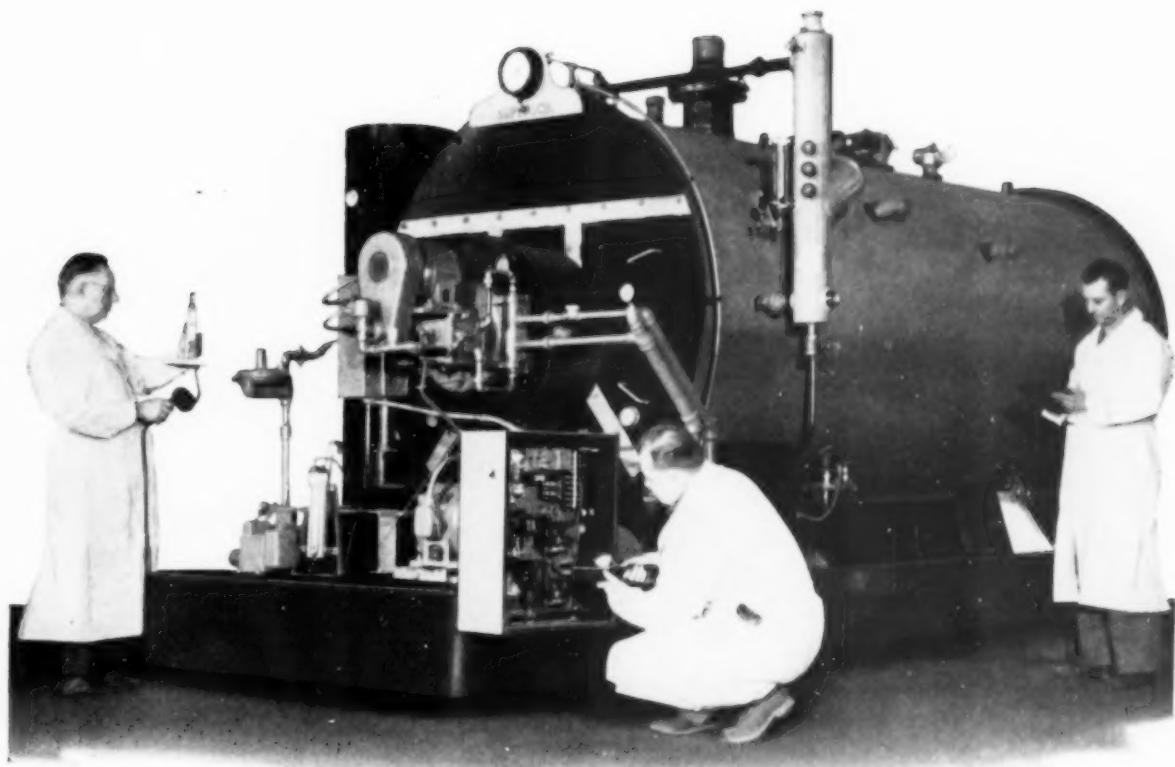
THE BETTER QUALITY... BIGGER VALUE LINE... IN BRASS, STEEL, IRON

CRANE VALVES

CRANE CO., General Offices: 836 S. Michigan Ave., Chicago 5, Illinois
Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING





Completely

FACTORY ASSEMBLED and TESTED
...for a GUARANTEED RESULT

There's no guesswork about the performance of a Superior Steam Generator. Complete factory assembly followed by efficiency tests conducted *at the factory* under actual firing conditions guarantee operation at more than 80% thermal efficiency.

And because they are completely factory assembled and factory tested, they arrive at your plant ready to go to work... *backed by undivided responsibility*.

Fully automatic, firing either gas or oil, installation is simplified and inexpensive. Their rigid channel iron base eliminates the need of special foundations. Superior's built-in induced draft makes an expensive chimney unnecessary. All interconnecting piping and wiring is completed at the factory... ready for connection to supply services and steam outlet.

When the accent is on modernization, buy a Superior Steam Generator. It's the modern way to buy economical steam.

18 sizes from 20 to 600 b.h.p. for pressures up to 250 p.s.i. or for hot water. For complete details, write for Catalog 611.

Five Superior Steam Generators ranging in size from 30 to 600 b.h.p. on the test line at the Superior plant in Emmaus, Pa.



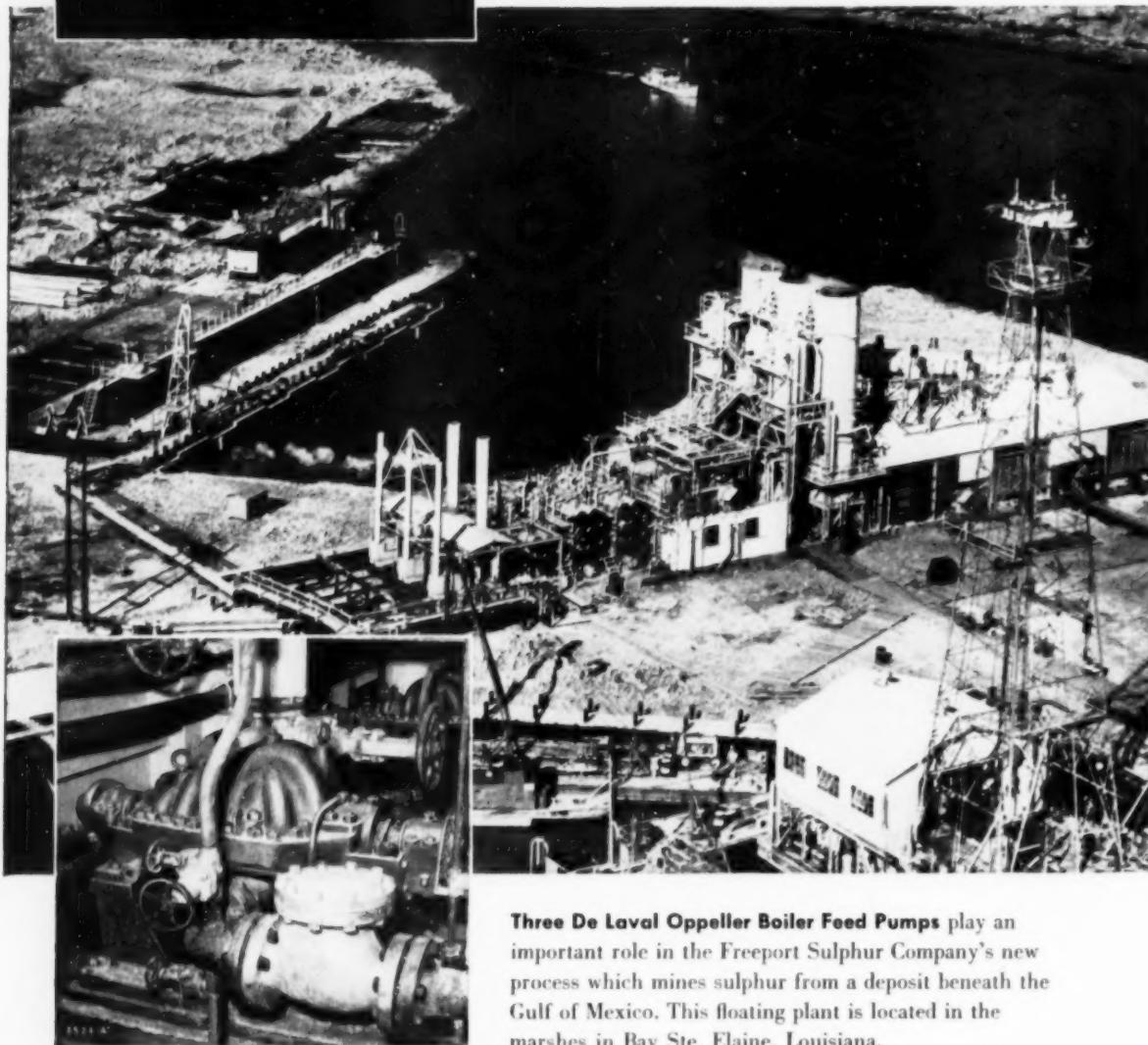
for performance you can **BANK** on

SUPERIOR COMBUSTION INDUSTRIES INC.
 TIMES TOWER, TIMES SQUARE, NEW YORK 36, N.Y.

SUPERIOR
 STEAM GENERATORS

DE LAVAL
OPPELLER
PUMPS

*are used for boiler feed
on floating process plant*



Three De Laval Oppeller Boiler Feed Pumps play an important role in the Freeport Sulphur Company's new process which mines sulphur from a deposit beneath the Gulf of Mexico. This floating plant is located in the marshes in Bay Ste. Elaine, Louisiana.

The De Laval Boiler Feed Pumps operate at 3,500 rpm with water heated to 297F. They are built with 12% chrome steel impellers and trim. The dependable performance of these units has led Freeport Sulphur to purchase six additional pumps for boiler feed service at two other mines. In addition to boiler feed, De Laval

Oppeller Pumps are used throughout industry for mine dewatering, descaling, desuperheater feed as well as for services in the petroleum, pipeline and marine fields. Capacities range up to 2,000 gpm, pressures to 1,200 psig, temperatures to 350F; materials to suit any service. For complete data, send for Catalog 1502.



DE LAVAL Oppeller Pumps

DE LAVAL STEAM TURBINE COMPANY

817 Nottingham Way, Trenton 2, New Jersey

DL-200

How to **INCREASE BOILER RATINGS** with your present furnace and stack

*Coppus-Dennis FANMIX Burners Give You
More Heat with No Other Major Change
in Equipment*

Coppus-Dennis FANMIX Burners give you *perfect mechanical mixing of fuel and air at the burner outlet . . . instantaneous ignition close to the burner . . . and complete combustion without visible flame* when burning natural gas. No other burner combines these three advantages.

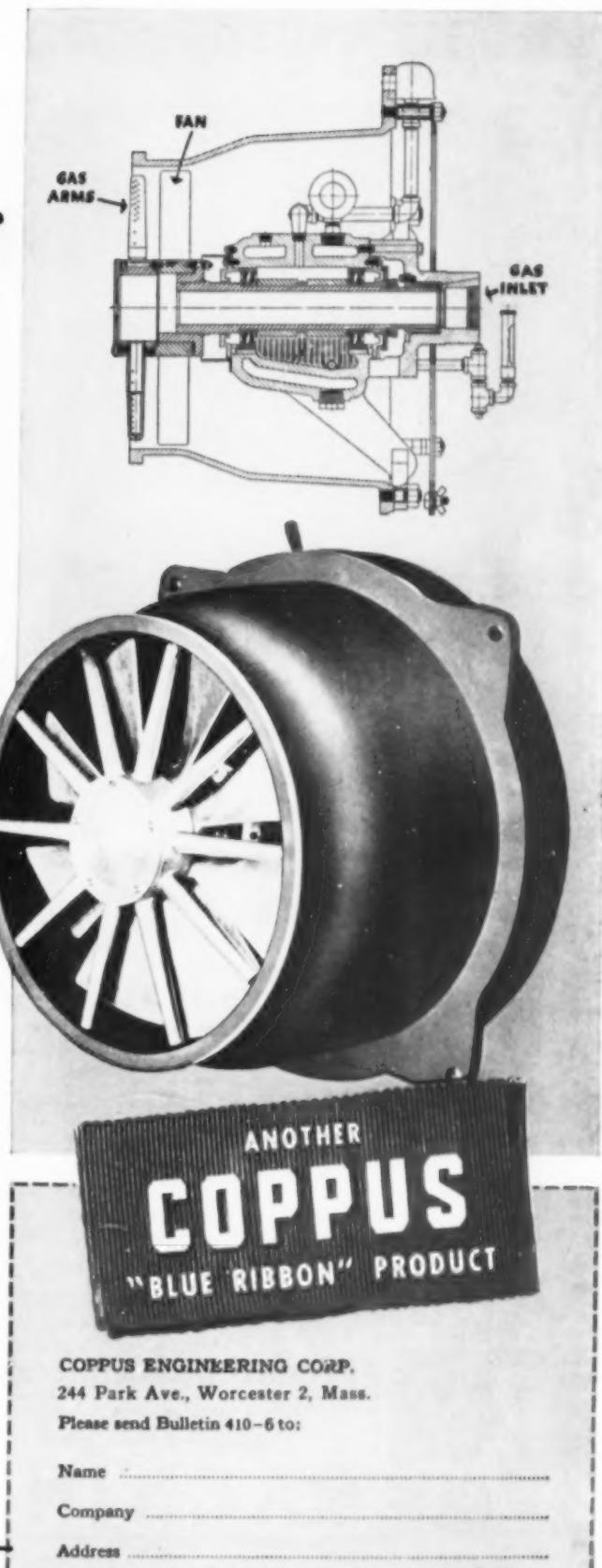
Because FANMIX delivers the *right* mixture of fuel and air *without blow-torch action*, all of your furnace space is used for combustion . . . *none for mixing*. That's why your present furnace can release more heat . . . why new installations can get more heat out of smaller furnace space.

Because FANMIX can be guaranteed to secure complete combustion of natural gas *with less than 5% excess air*, you get uniform "radiant heat" *without drifting hot spots*. That's why a FANMIX-fired furnace seldom varies in temperature more than 5% over its entire area.

WRITE FOR ALL THE FACTS

When you see in Bulletin 410-6 how fuel escaping from orifices in rotating driver arms rotates the fan to draw the correct proportion of air into the path of the fuel at right angles . . . how FANMIX creates its own forced draft, reduces stack requirements, prevents cracking of "wet" gas . . . how two FANMIX types handle either gas or oil or any combination of both — you'll understand why FANMIX Burners have such wide acceptance in oil refineries and power plants.

Send for the Coppus-Dennis FANMIX Bulletin 410-6. Coppus Engineering Corporation, Worcester 2, Mass. Sales Offices in THOMAS' REGISTER. Other Coppus "Blue Ribbon" products in BEST'S SAFETY DIRECTORY, CHEMICAL ENGINEERING CATALOG, and REFINERY CATALOG.

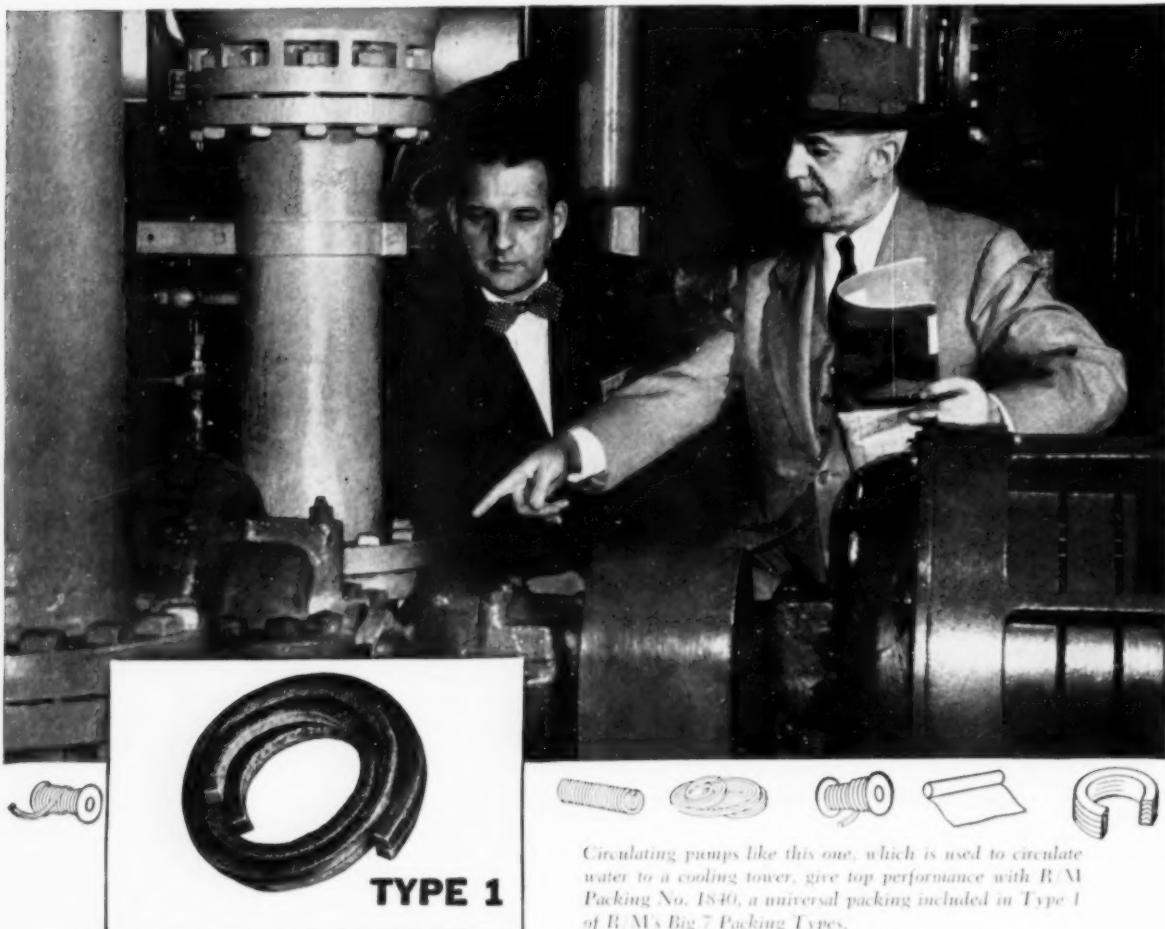


ANOTHER
COPPUS
"BLUE RIBBON" PRODUCT

COPPUS ENGINEERING CORP.
244 Park Ave., Worcester 2, Mass.
Please send Bulletin 410-6 to:

Name _____
Company _____
Address _____

R/M's **BIG 7** Packing Types meet 95% of all packing needs



Circulating pumps like this one, which is used to circulate water to a cooling tower, give top performance with R/M Packing No. 1840, a universal packing included in Type 1 of R/M's Big 7 Packing Types.

Let R/M lower your maintenance costs

R/M's Big 7 Packing Types are engineered to give custom built performance in all but the very rarest packing applications. By standardizing on this basic line of just seven field tested packing types (you probably need only three or four in your plant) you can reduce the number of times you have to re-pack, the

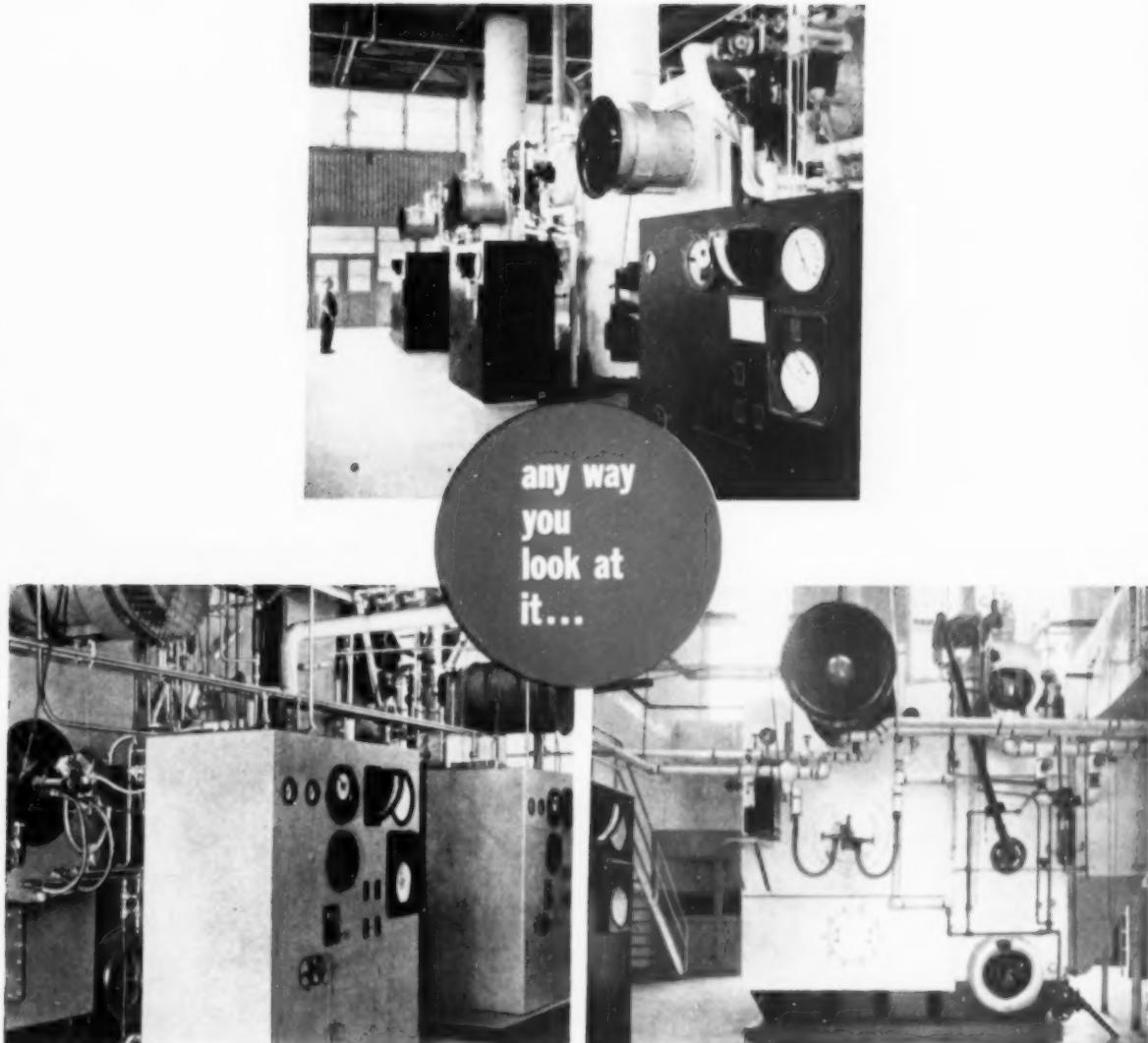
labor costs of packing, the labor costs of "too frequent" adjustments, the costs of damage to equipment, and the costs caused by non-uniform performance. You will also be able to cut your packing inventory and simplify your ordering. For details, call in your R/M distributor.

R/M PACKINGS FOR MAINTENANCE PURPOSES ARE SOLD ONLY THROUGH AUTHORIZED R/M DISTRIBUTORS



RAYBESTOS-MANHATTAN, INC., Packings • Asbestos Textiles • Industrial Rubber, Engineered Plastic, and Sintered Metal Products • Abrasive and Diamond Wheels • Rubber Covered Equipment • Brake Linings • Brake Blocks • Clutch Facings • Fan Belts • Radiator Hose • Bowing Belts

FACTORIES: Bridgeport, Conn.; Manheim, Pa.; No. Charleston, S.C.; Passaic, N.J.; Neenah, Wis.; Crawfordsville, Ind.; Peterborough, Ontario, Canada.



The B&W Integral-Furnace Boiler, Type FM is compact, portable, simple, reliable

Almost one and one-half million pounds of steam capacity for building heating and allied services already have been credited to the B&W Integral-Furnace, Type FM. This shop-assembled unit, for steam loads between 2900 and 28,000 lb per hr at pressures to 235 psi, enjoys such wide popularity with users in a broad range of industrial, commercial, institutional and other classifications that, today, FM Boilers are in service or on order for a total steam capacity of more than 7,000,000 lb per hr.

Automatic control and efficient handling of variable loads are among the many features of this versatile B&W steam generator. The unit is easy to install, and is delivered complete with firing equipment for oil or gas, ready to skid or lift into position, hook-up and place in operation.

The Type FM Boiler has proved to be ideal for small to medium-sized installations where operators have additional duties . . . even for larger installations, two or more Type FM Boilers often are selected instead of large boilers requiring complete field erection and close operating supervision.

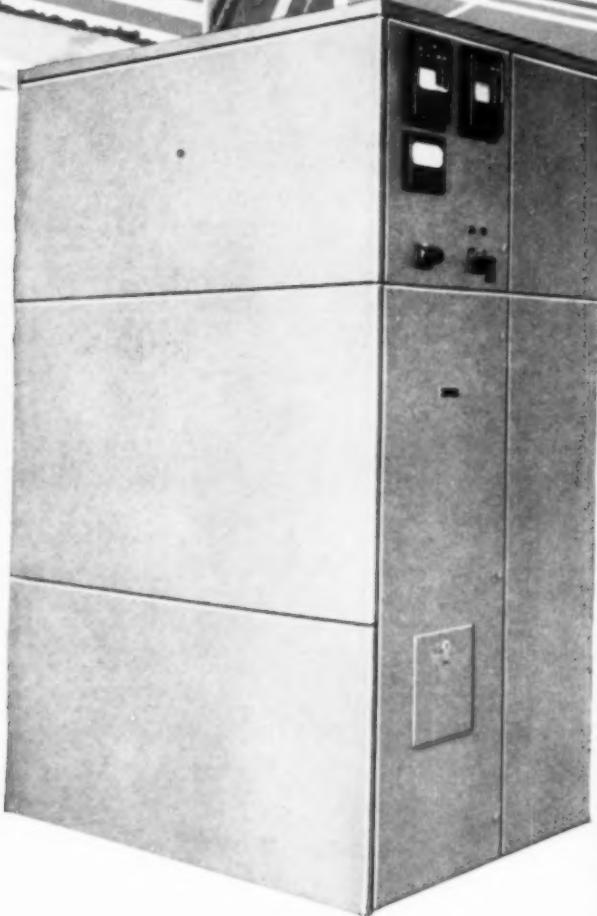
COST-SAVING FEATURES

- * Saves Erection Time and Cost
- * Meets Wide Range of Service
- * Handles Quick Load Changes
- * Fast Steaming
- * Low Maintenance
- * Easy Accessibility
- * Burns Oil and/or Gas
- * Saves Fuel
- * Saves Space
- * Safe, Automatic Operation



**BABCOCK
& WILCOX**

Write for Bulletin G-76B, which details the cost-saving features of the B&W Integral-Furnace Boiler, Type FM. The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.



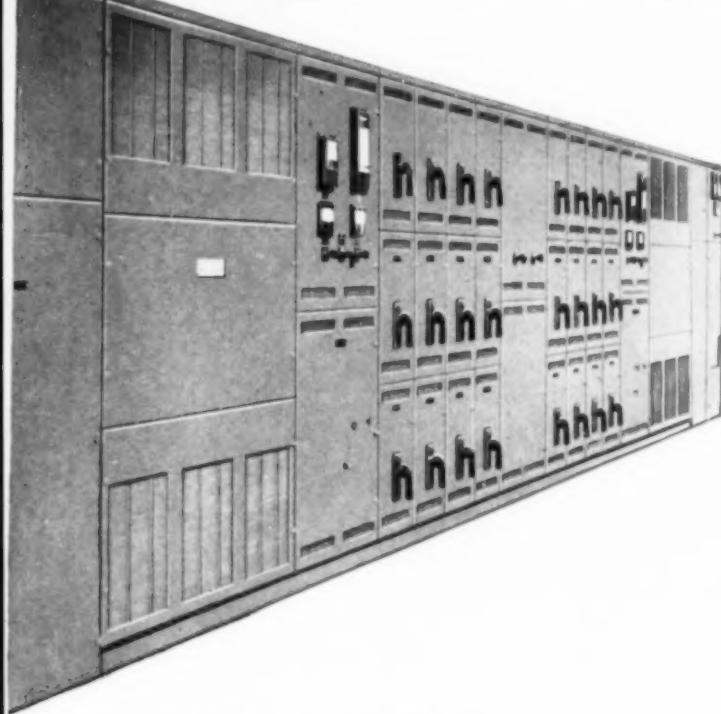
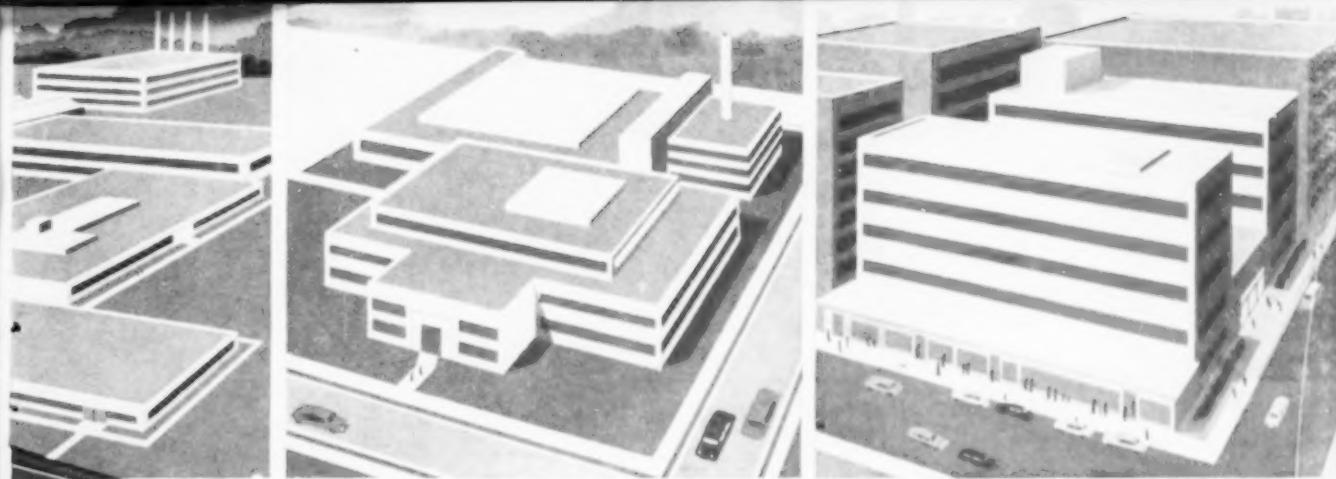
AS VITAL AS YOUR PLANT'S FOUNDATION

**unit substations are
basic plant investments**

In central stations, industrial plants, or buildings—engineering management recognizes the need for power distribution equipment which is safe, dependable, economical, and adaptable. To Unit Substations, forming the *nerve centers* of any distribution system, is delegated the important responsibility of providing continuous power and circuit protection for years to come. Unit Substations, therefore, should not be merely *adequate*, but they must have quality to be a sound, *profitable* capital investment.

THE SYMBOL OF QUALITY SWITCHGEAR





For Details Contact the I-T-E Field Office nearest you
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**I-T-E Circuit Breaker Co., 19th and Hamilton Sts.
 Philadelphia 30, Pa.**

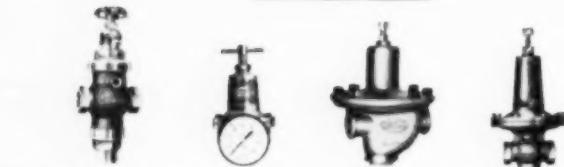
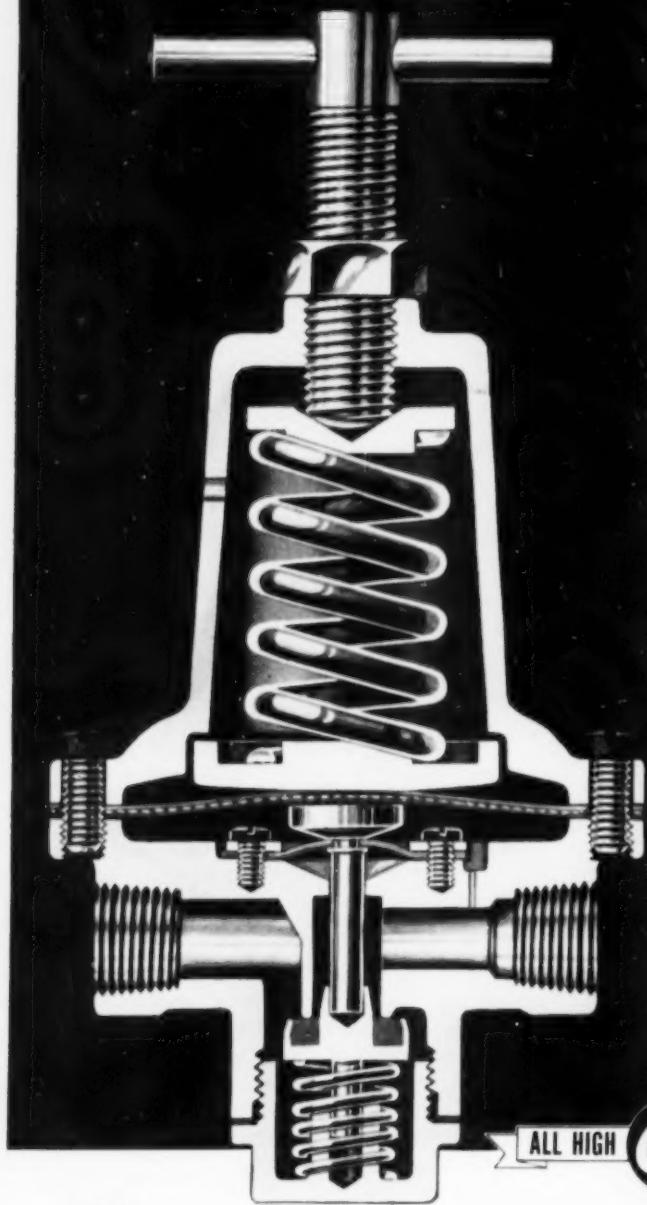
**I-T-E offers a
 complete line of quality
 unit substation equipment**

Through the years, I-T-E has led in the development and manufacture of quality circuit breakers and switchgear. Similarly, since the inception of the Unit Substation, and its use in modern distribution systems, I-T-E has continued to hold this same envied position. Today, I-T-E supplies a full line of quality Unit Substations, in types and sizes to fit every application.

As an *extra service*—to help users make the wisest investment possible—I-T-E furnishes engineering assistance in the selection and application of equipment, preparation of specifications, and co-ordination of all job requirements. There are I-T-E Application Engineers in every major industrial area for this purpose.

UNIT SUBSTATIONS

MASONEILAN No. 71 FOR AIR



No. 11 for steam No. 71 for air No. 227 for water No. 33 for steam, air

Tough Guy!

Here's a tough air regulator that reduces maintenance to a minimum. Compact, easy to service, its simple design and sturdy brass construction stands up under rugged use and abuse.

With Sensitive Reflexes

Masoneilan No. 71 responds instantly to pressure variations . . . stabilizes line pressures . . . keeps them accurate. It provides uniform control, large capacity with minimum pressure drop.

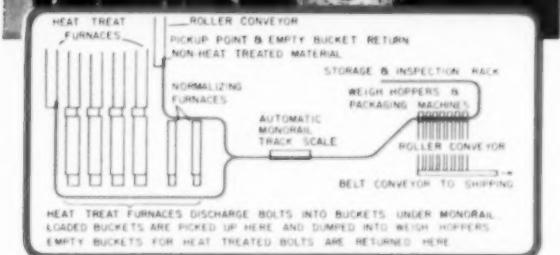
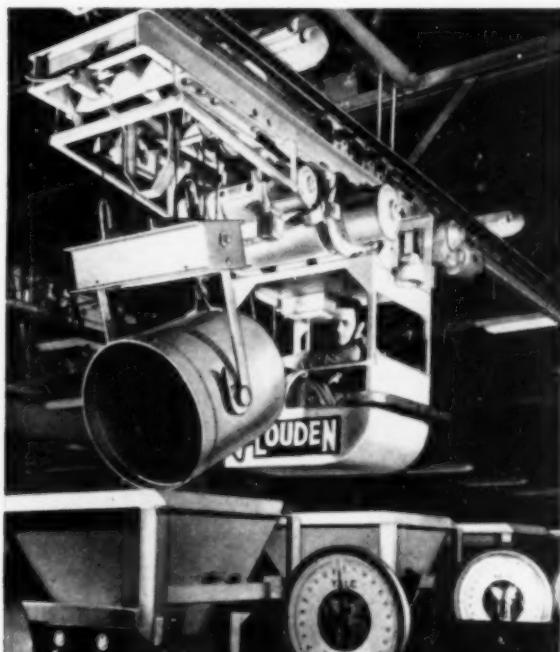
Available for pressures up to 250 psi reduced to any pressure from 5-60 psi; 60-100 psi. Sizes $\frac{1}{4}$ " to $\frac{1}{2}$ ". Pressure gauge included. For more information, write Mason-Neilan Regulator Company, 1206 Adams Street, Boston 24, Mass.



MASONEILAN REGULATORS

Keep Pressure Under Control!

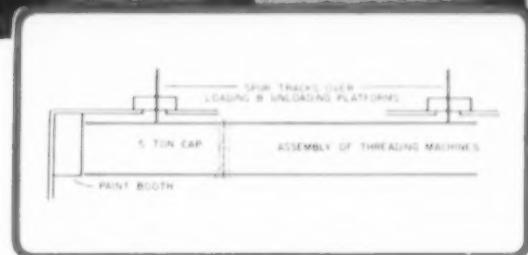
Parts for packaging or components for assembly?



Louden engineered overhead handling speeds and saves in many ways

Many plant executives have found a broad avenue to savings and production increases in Louden engineered Monorail and Crane systems . . . products of the longest overhead handling experience.

Above, left, a Louden cab-controlled carrier conveys heat-treated parts from furnaces to packaging machine hoppers. With handling overhead, furnaces are grouped closer together. Rehandling is elim-



inated. Machine non-productive time is cut. Much the same is true of the installation shown at the right where a Louden 5-ton crane is handling a component for final assembly in a screw thread machine factory.

Let Louden's long experience and complete line of equipment bring you the best solution to your handling problems.

THE LOUDEN MACHINERY COMPANY
4204 Superior, Fairfield, Iowa
A Subsidiary of Mechanical Handling Systems, Inc.

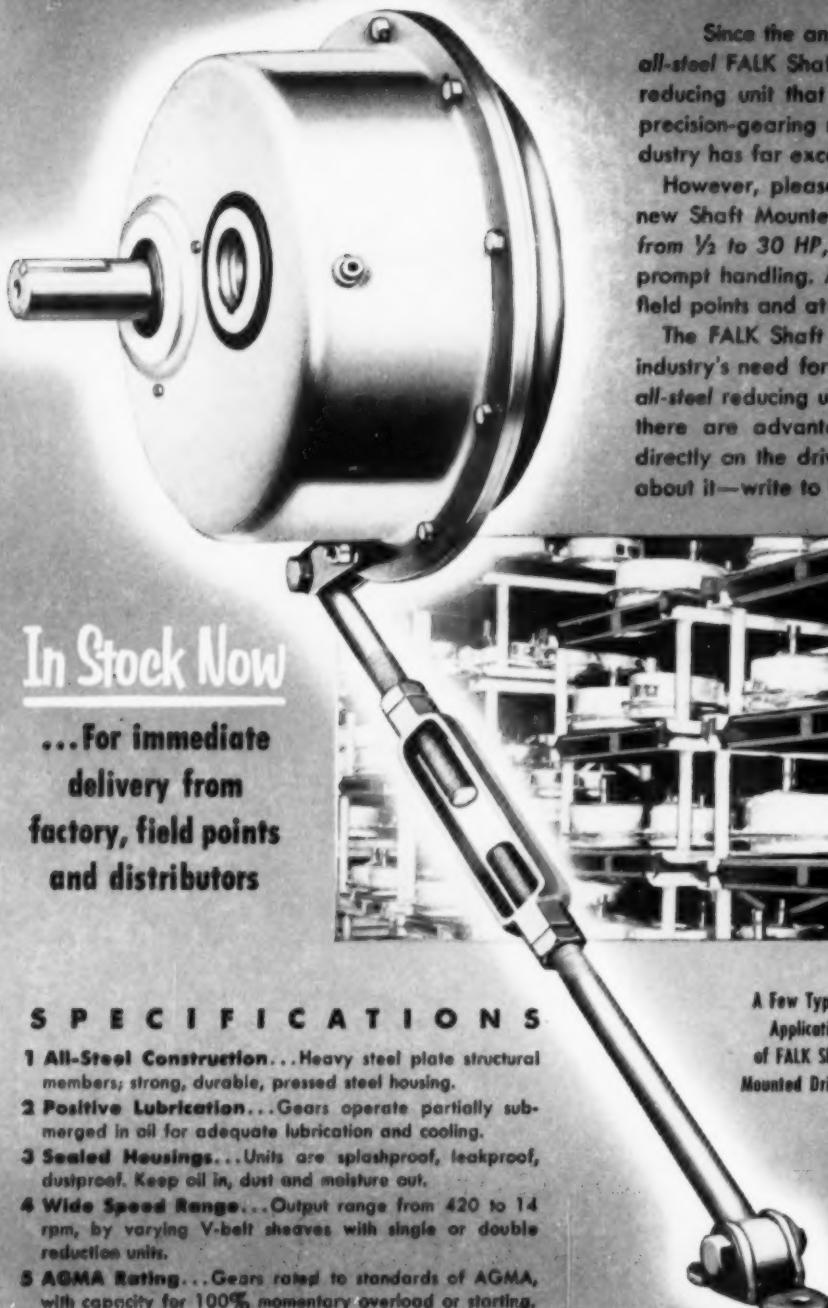
SEND FOR THIS BOOK—
Write for your copy of
"Economical Material
Handling" . . . full of time-
saving, cost-cutting ideas
and case histories. Free
. . . no obligation.



Since 1867—the first name in materials handling

★ A STURDY, COMPACT SPEED-REDUCING UNIT

The new ALL-STEEL FALK Shaft Mounted Drive



In Stock Now

...For immediate
delivery from
factory, field points
and distributors

S P E C I F I C A T I O N S

- 1 **All-Steel Construction**... Heavy steel plate structural members; strong, durable, pressed steel housing.
- 2 **Positive Lubrication**... Gears operate partially submerged in oil for adequate lubrication and cooling.
- 3 **Sealed Bearings**... Units are splashproof, leakproof, dustproof. Keep oil in, dust and moisture out.
- 4 **Wide Speed Range**... Output range from 420 to 14 rpm, by varying V-belt sheaves with single or double reduction units.
- 5 **AGMA Rating**... Gears rated to standards of AGMA, with capacity for 100% momentary overload or starting.
- 6 **Overhung Load**... Maximum capacity provided by oversize bearings, large alloy steel shafts—with wide span between.
- 7 **Precision Gearing**... Alloy-steel gears, precision cut and shaved for accurate profile and finish. Pinions crown shaved for quiet running.
- 8 **Backstop**... Built-in backstop provided where prevention of "back-run" or reversal of driven shaft is required.
- 9 **Hollow Shaft Mounting**... Permits units to be mounted directly on driven machine shaft extension.
- 10 **Tie Rod**... Tie rod and turnbuckle serve as anchor and facilitate V-belt or chain adjustment.

Since the announcement, early this year, of the new all-steel FALK Shaft Mounted Drive—the versatile speed-reducing unit that complements the famous FALK line of precision-gearing reducers—its acceptance throughout industry has far exceeded our anticipation.

However, please be assured that your orders for the new Shaft Mounted Drive, in any or all of the six sizes from $\frac{1}{2}$ to 30 HP, single or double reduction, will receive prompt handling. All are in stock now at the factory, at field points and at distributors across the country.

The FALK Shaft Mounted Drive is the ideal answer to industry's need for a truly high-quality, rugged, compact, all-steel reducing unit for the countless applications where there are advantages in mounting the reduction gear directly on the driven shaft. You will want to know more about it—write to Department 247 today.

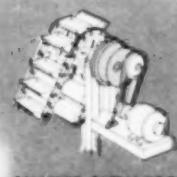
A Few Typical
Applications
of FALK Shaft
Mounted Drives



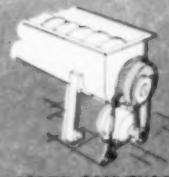
BELT CONVEYOR



LINE SHAVING



BUCKET ELEVATOR



SCREW CONVEYOR

FALK

...a good name
in industry

THE FALK CORPORATION, 3001 W. Canal St., Milwaukee 8, Wis.

Write to Department 247



We call it...

Raw Water #628

It's really Mississippi River water. An oil refinery uses it for boiler feed and for process water.

We worked on #628 . . . on the whole problem of this refinery's water requirements.

As it came from the river #623 obviously could not be used. It was so full of dirt it looked like *café au lait*.

Treated now through Graver equipment, it is completely safe for delicate, high pressure boilers.

Raw water #623 could have been useless for any of several other reasons: hardness, silica, bicarbonate alkalinity or oxygen content. No matter what the problem, Graver is in business to help you solve it . . . with laboratory and pilot plant testing, equipment design, manufacturing, erection facilities, and anything else it takes to give the water you want.



Graver Water Conditioning Co.

A Division of Graver Tank & Mfg. Co., Inc.

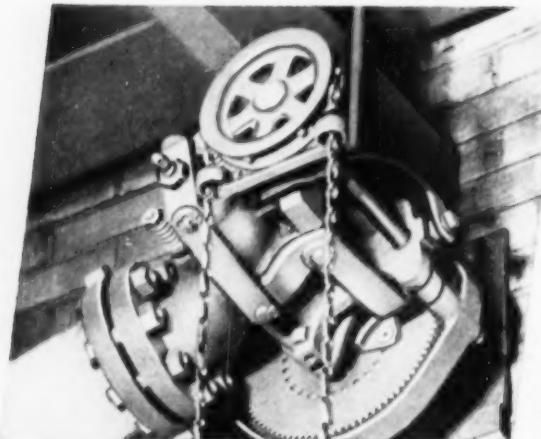
216 West 11th St., New York 11, N.Y.

• Go to Graver

for Water Conditioning

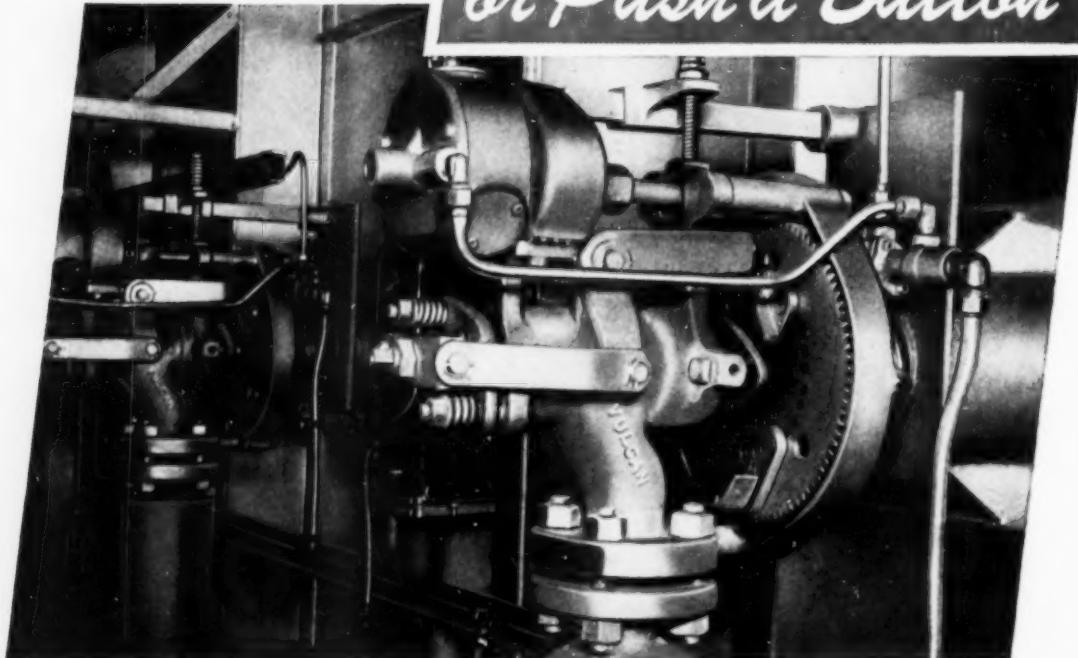
Pull a Chain

for full 360° boiler cleaning



Hand-operated or motor-driven—every Vulcan Rotary Soot Blower gives exactly the same 360-degree cleaning action. In fact, you can change a manually-operated Vulcan Rotary to an automatic unit by merely replacing the sheave wheel with an air or electric motor, and adding a control block. Uniform blowing pressure—from start to finish of the cycle—is assured by an exclusive trigger-action valve. And this valve seals off corrosive furnace gases from internal parts. For better boiler cleaning at low cost, depend on Vulcan.

or Push a Button



COPES-VULCAN DIVISION, Continental Foundry & Machine Company, ERIE 4, PA.

VULCAN *Rotary* **SOOT BLOWERS**

Consider the unique K-Weld technique... when critical piping is the order!



With today's operating conditions already approaching the limits of available power piping materials, the necessity for expert fabricating techniques cannot be overstressed. And it is here that the K-Weld process, Kellogg's unique welding method, has already played an important part.

For example, K-Weld was used throughout—both in the shop and in the field—for the welding of austenitic stainless steam piping for service at 1100 F and 2350 psig on two 145,000 kw units in Kearny station of Public Service Electric and Gas Co. of New Jersey.

Main advantage of this new welding process lies in the fact that it assures *complete penetration without backing rings*. Their elimination precludes the possibility of crack propagation at the weld root which would produce ultimate failure as a result of severe operating conditions.

An additional advantage is the elimination of the possibility of the backing ring breaking off and damaging equipment. Furthermore the lack of a ring materially reduces turbulence in pipes.

The K-Weld process—developed in Kellogg's Welding and Welding Practices Group—entails the use of inert-gas arc welding of the first pass with inert-gas *under controlled pressure* on the inside of the piping. It permits an average welder qualified for inert-gas arc welding to obtain excellent results either in the field or in the shop. The K-Weld technique may be used on all power piping materials.

Fundamental development work leading to advances in the art of fabrication is an important part of Kellogg's basic stock in trade. Many power station designers and utility companies also say it's one basic reason why they time and again specify Kellogg when critical power piping is the order.

New Power Piping Booklet Published... Send for descriptive literature about Kellogg's extensive facilities for assuring the highest quality workmanship. A section of the booklet is devoted to detailed coverage of the K-Weld process.

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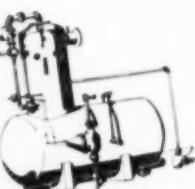
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It is impossible to show in limited space the unequalled range of Elgin-Refinite services. But note that we do briefly outline opposite how much more Elgin-Refinite has to offer in the four basic categories of water conditioning. This combined experience and scope is your assurance that your water conditioning problem will be solved in the most versatile, dependable, economical way by Elgin-Refinite!

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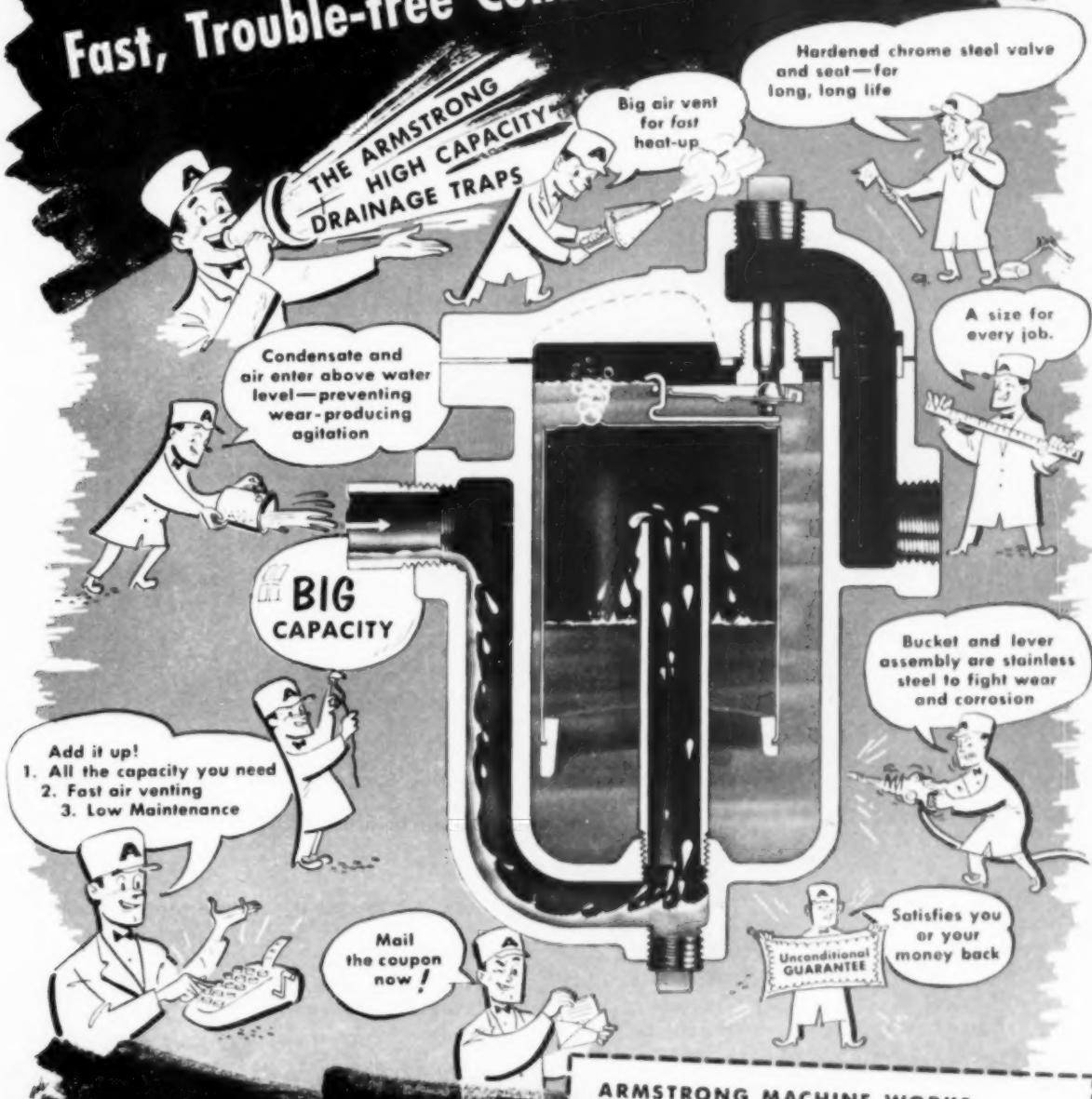
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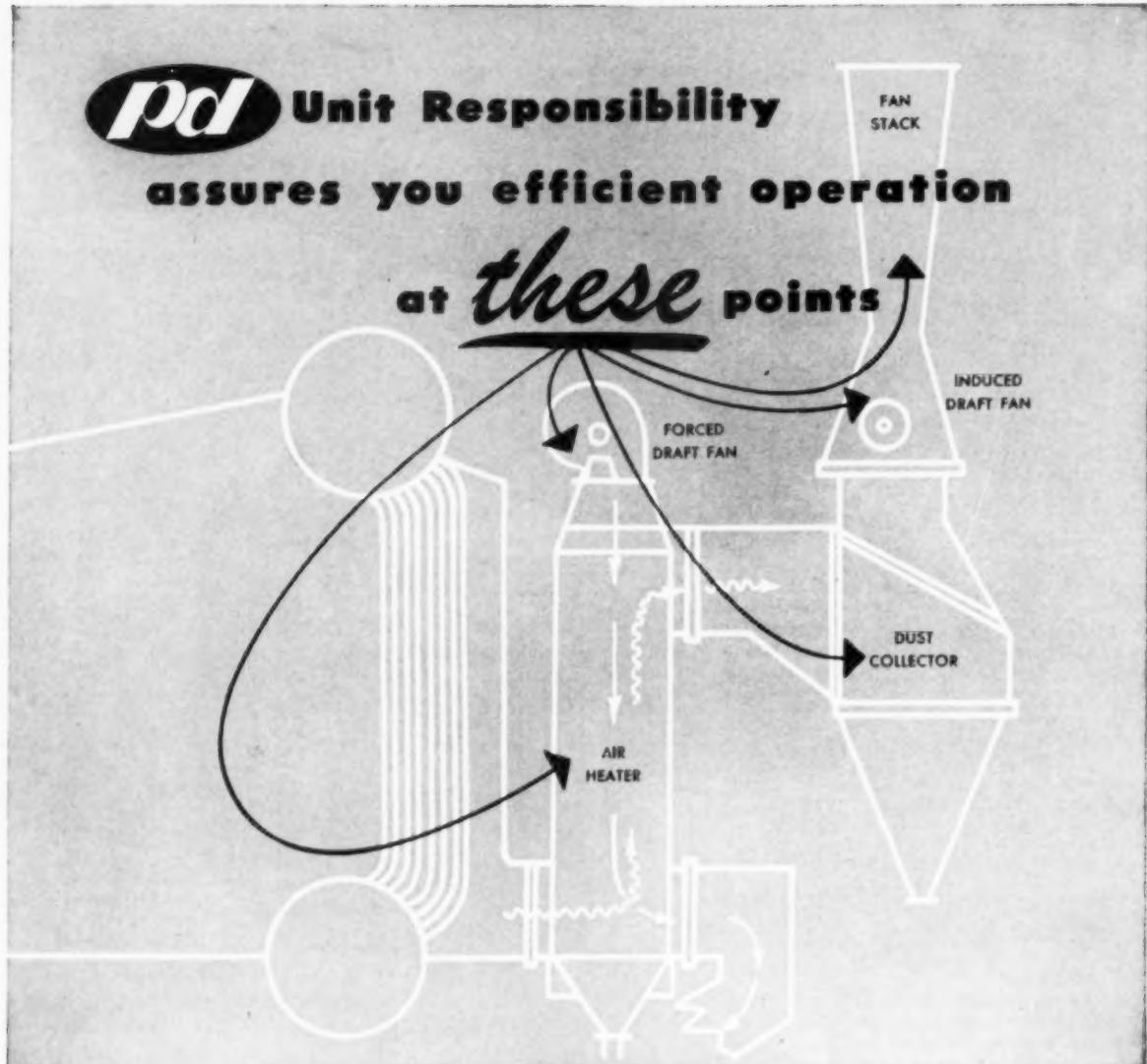
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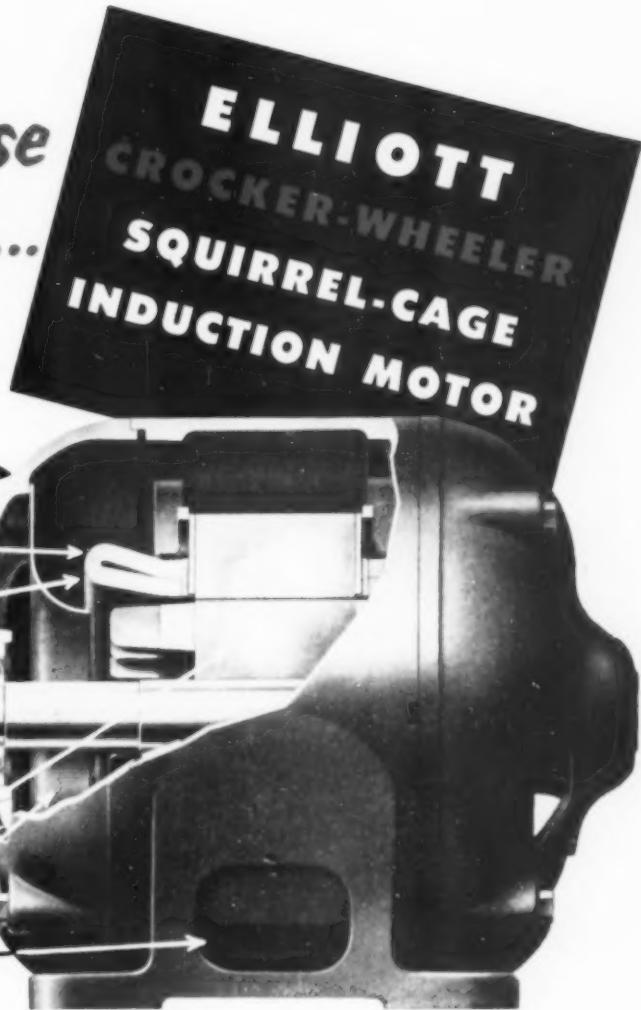
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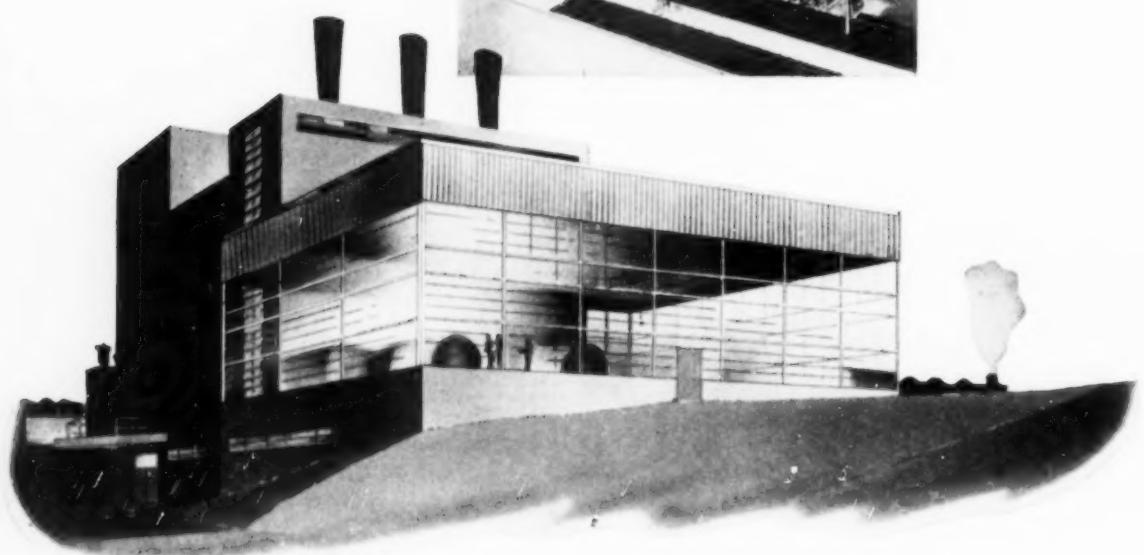
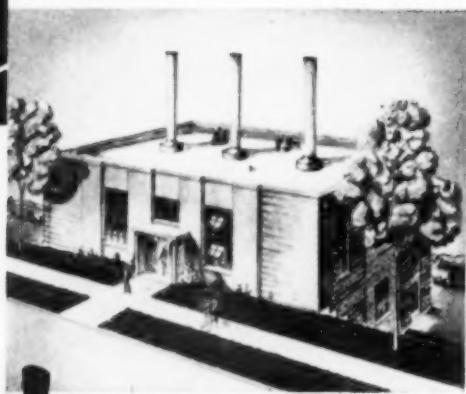
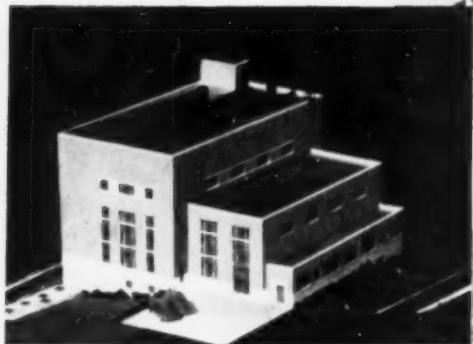
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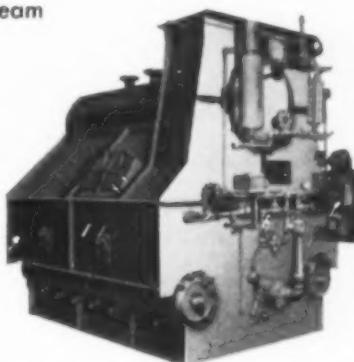
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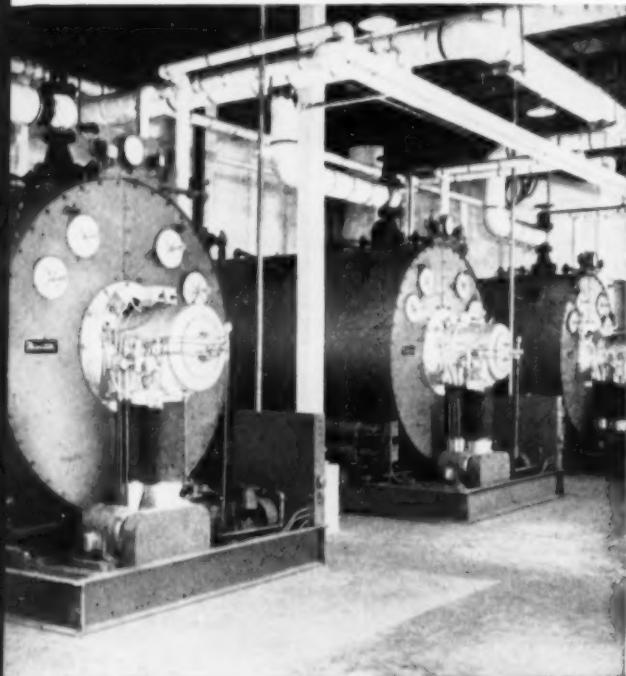
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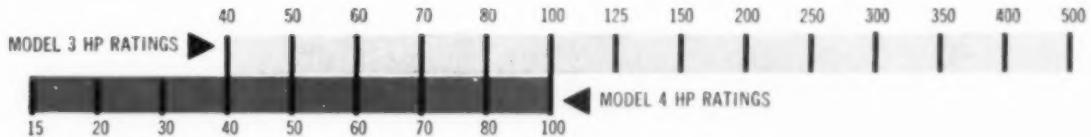
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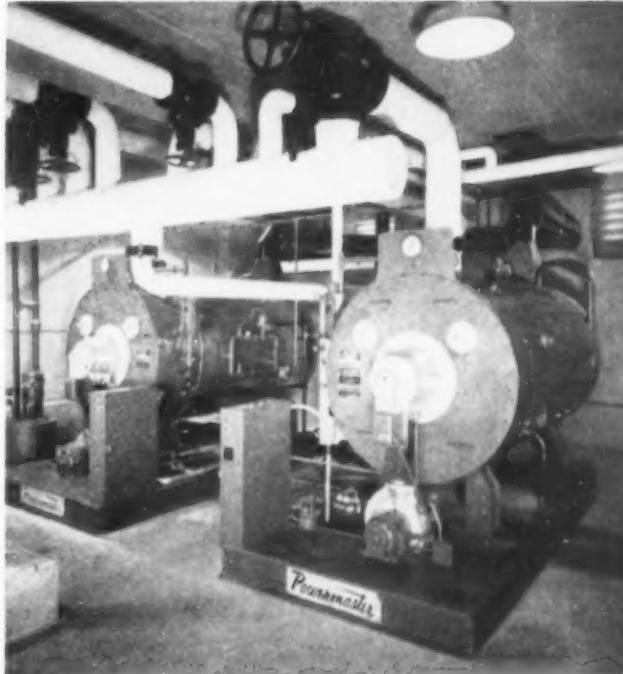
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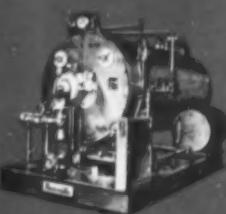


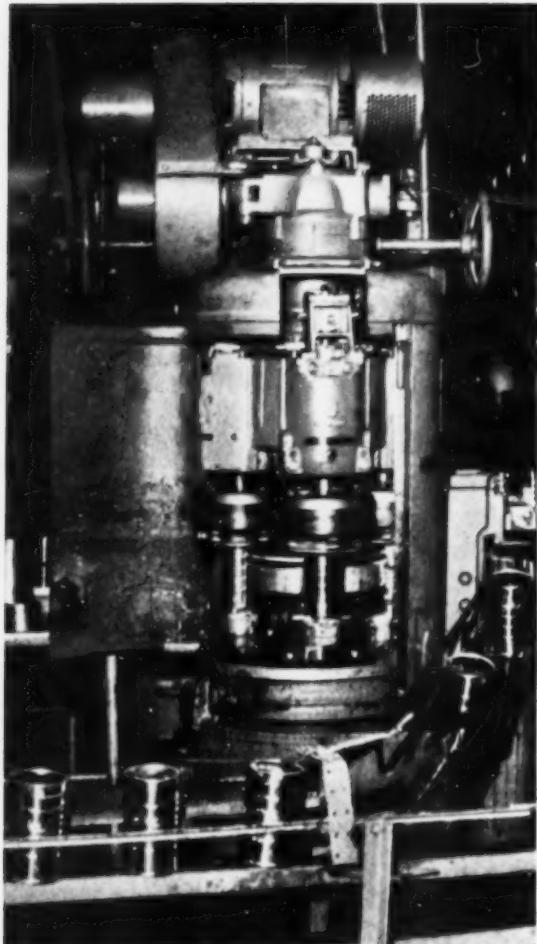
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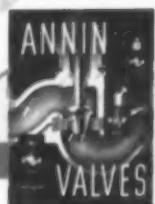
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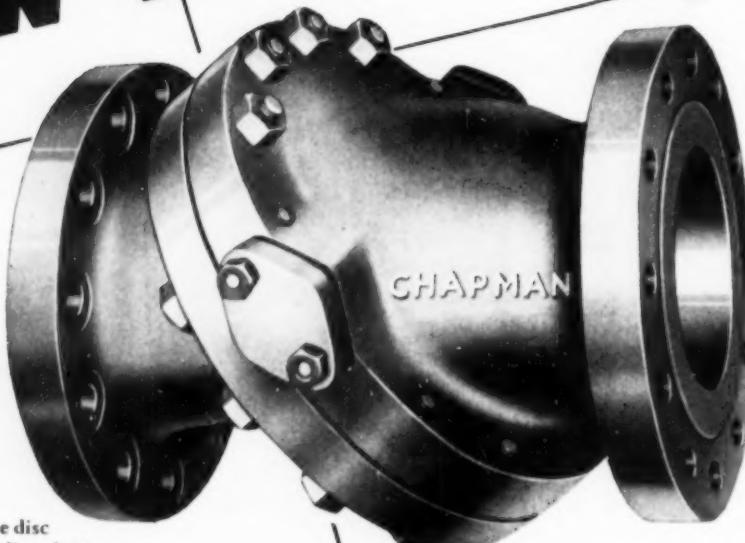


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**Only Chapman's Tilting-Disc Check Valves
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**NO SLAMMING
LOW HEAD LOSS
LOW WEAR**



Here's the check valve that stays open with minimum flow resistance, closes fast without slamming, closes tight without sliding or scraping wear.

Cushioned Closing

Pressure against the upper part of the disc cushions it as it closes. Then the disc *drops* tight to its beveled seat after the valve has swung closed. Both actions are fast, but they are fluid-cushioned. Seating is quiet in all but unusual piping arrangements.

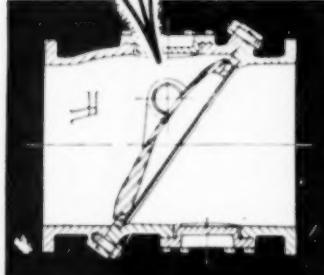
Low Flow Resistance

The streamline design of the valve body and disc eliminate turbulence and cut flow resistance. The fluid holds the disc tightly against its stops, without flutter. The body is larger around the disc, so the net valve area is at least as much as the pipe area.

Minimum Wearing Action

Because the disc *drops* tight, it doesn't slide against the seat. The wear on hinge pins is small because the disc doesn't flutter. Unusually husky construction in every detail means long life under the toughest conditions for Chapman's Tilting Disc Check Valve.

Full engineering and construction data are in Chapman's Catalog #30. Write for it now.



Here's Why
CHAPMAN Tilting Disc
Check Valves Keep Quiet
All Their Lives

This specially de-
signed "airfoil" disc balances perfectly in
open position . . . then drops easily to closed
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Timely Comments



OUR ECONOMIC FUTURE—

Exactly What Business Enterprise Makes It

POINTING out that government can do no more than to create a favorable economic climate providing the fullest possible measure of opportunity and incentive for its citizens, Benjamin F. Fairless, board chairman of U. S. Steel, recently emphasized that the responsibility for prosperity or recession in the business community rests squarely upon business and industry itself.

"Government alone," he declared, "can neither create prosperity nor overcome depression." He warned, however, that if politically-minded alarmists are permitted to destroy the confidence of the American people, or to undermine their faith in the future, neither business nor the government can prevent depression.

In an address before the 117th Annual Meeting of the Delaware Chamber of Commerce, Mr. Fairless said the government has laid important groundwork for prosperity by: (1) Providing peace as an economic answer to the boom and bust which war produces, (2) stabilizing the currency, and (3) returning competition to a free and open market where the customer determines what shall be produced and what he is willing to pay for it.

The government is now striving to provide maximum possible incentive so that the ingenuity, ambition and enterprise of the country will not be impaired, Mr. Fairless said. Once this has been accomplished, he stated, our economic future will be exactly what business enterprise makes it.

Following is a summary of Mr. Fairless' remarks:

1. Talk of a recession is politically inspired by the advocates of "big government" attempting to bring about a change in administration.

2. Unemployment has been exaggerated. It is very close to the irreducible minimum; and is actually below the average of recent years.

Moreover, there are 3.5 million more persons working today than in 1947.

3. Plans calling for deficit spending up to \$12 billion this year would result in another crippling round of inflation.

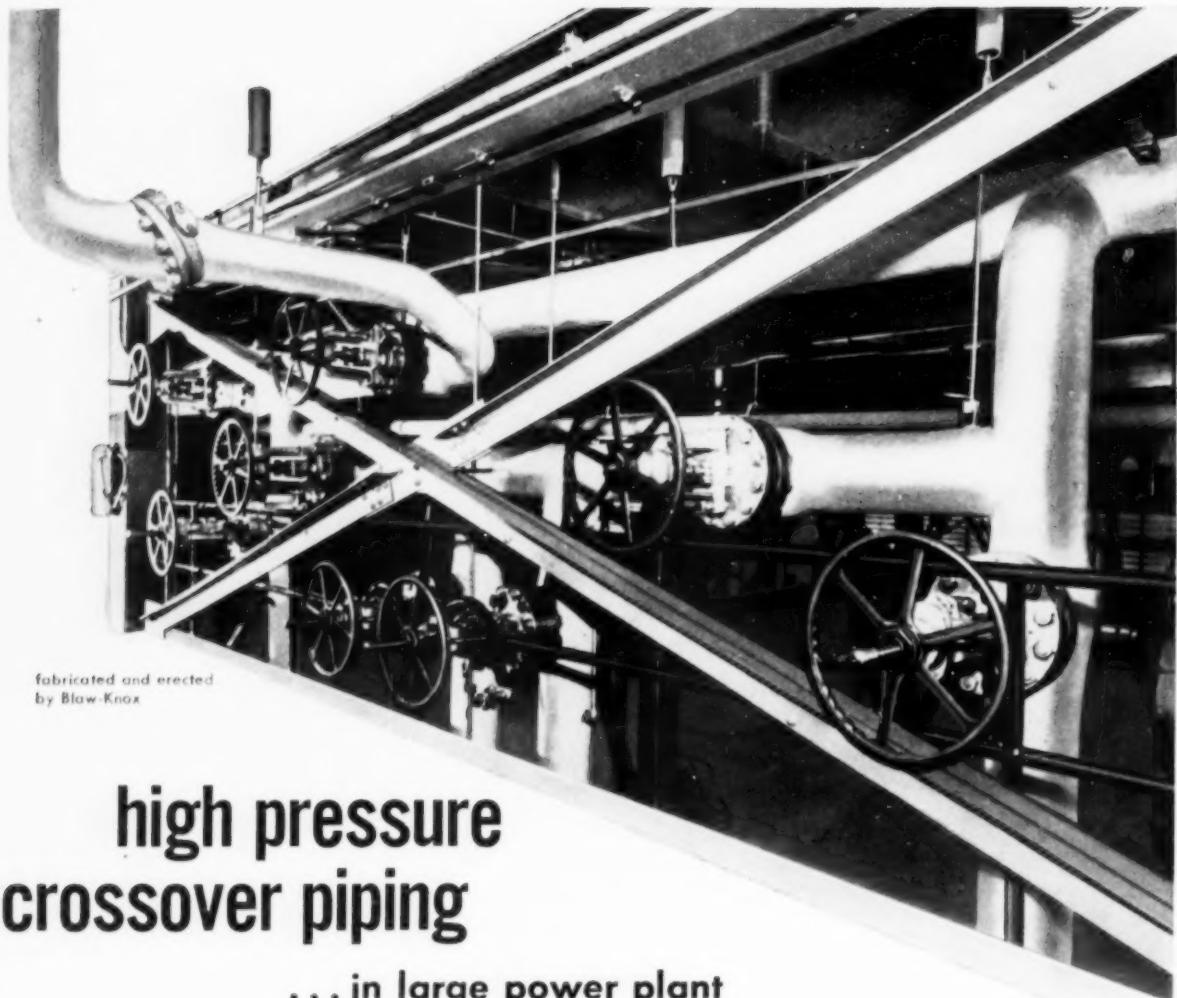
4. The \$15 billion worth of public works projects on the shelf is small compared with the \$28 billion spent last year by American business for plant equipment alone. Business expenditures not only create jobs, but provide productive facilities to generate new purchasing power for many years to come.

5. It is up to American business to prevent a recession by increasing the country's earning and purchasing power, and in doing so raise the living standard of all people. The past record is conclusive that the government cannot prevent a recession.

6. Government, however, must do two things if business successfully is to avert a depression: (a) maintain an economic atmosphere which will encourage the flow of private investment, and (b) enable American business to operate at peak efficiency by scrapping obsolete equipment even if it is not worn out or fully depreciated.

7. In addition to the foregoing functions, there are four other requirements which the government should provide: (a) peace for prosperity instead of the boom and bust which war produces, (b) stable currency, (c) competition in a free and open market, and (d) maximum possible incentive for all people so that enterprise will not be impaired. The Government has met the first three requirements in the last 12 months and is striving to accomplish the fourth.

8. When the Government accomplishes the fourth point, the future of the country's economy will be exactly what private enterprise makes it; and private enterprise cannot—and will not—deny it.



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by Blaw-Knox

high pressure crossover piping

... in large power plant



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Whether you need a complicated, high pressure piping system, such as this one, or a relatively simple job, you can always turn the entire job over to us. And we'll follow through . . . in close cooperation, of course, with your consultants or your own organization.

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Plus a complete service force with modern machinery for field work and erection . . .

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What service do you require?

We will, for instance, (1) engineer, fabricate, and erect your job . . . or (2) simply fabricate and erect . . . or (3) fabricate only.

Our engineers will quote from your drawings . . . or, when desired, make a field study of your piping requirements before quoting.

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Complete prefabricated power piping systems for all pressures and temperatures . . . plus complete line of functional spring hangers • rigid hanger assemblies • overhead roller assemblies • supports • vibration eliminators

Industry Speaks

SOUTHERN POWER
AND INDUSTRY

Engineering IS People

*Knowledge of humanities and ability
to express thoughts clearly are the
essentials of professional success.*

Adapted from comments by **MASON G. LOCKWOOD** before a recent meeting of the **Georgia Engineering Society** in Atlanta, Ga. Mr. Lockwood, Consulting Engineer of Houston, Texas, is National Vice-President of the **American Society of Civil Engineers**.

AM going to undertake to show that engineering is people. Not, if you please, that engineers are people. The latter idea already is rather generally accepted in most circles these days.

Politicians, lawyers, doctors, teachers, journalists, public relations people—on up to and including the clergy, deal altogether and all the time with people and nothing but people. Too often and too long we have thought of engineering as a different sort of pursuit, a science concerned with only the inanimates of nature—materials, forces, machines and structures. Not people.

The classic definitions of engineering have emphasized the inanimate. Classically defined, engineering is the art or science by which nature's materials are made into useful structures, machines, and products. I submit, however, that **engineering, like religion and politics, is people too.**

Every true profession supplies a fundamental need of mankind. And highly regarded professional men such as lawyers, ministers and physicians deal generally with intimate, personal, and sometimes rather intangible needs. For example, man's soul, his health, his mental development, his relationships with other men.

The engineering profession really differs from the others only in the character of the need which it supplies for people. Engineering ordinarily deals with the physical, tangible requirements of society. So does architecture, the other major component of the design profession, although perhaps not quite so exclusively as engineering.

Basically, it may have been because of our preoccupation with tangible things—structures, ma-



Mason G. Lockwood

chines, materials and substances—rather than with man's more personal needs, that society has been slow to accept engineering as a profession. We have been related often to the trades and crafts rather than to the professions. And we get pretty bitter about it because that concept, however, widespread, is ridiculous. Yet we would do well occasionally to recall one of the most profound remarks of one of our most profound authorities on human nature. Abraham Lincoln observed: "A universal feeling, whether well or ill-founded cannot be safely disregarded."

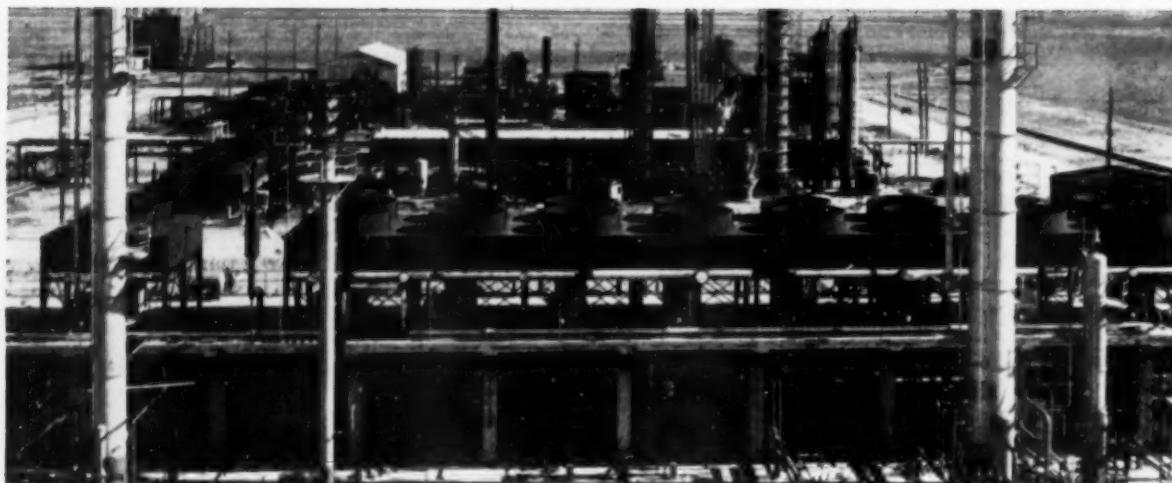
The trouble is, many of us unfortunately manifest traits more characteristic of craftsmen. An expert machinist, electrician, stone mason or engraver quite laudably strives intently to become an even finer machinist, electrician, stone mason or engraver. But you would seldom hear of one of these studying the related crafts. Neither is he likely to concern himself with a study of people whom he hopes will benefit from his work.

Too many of us engineers have been like that also—**too much preoccupied with engineering and too little concerned with people.** We fail to remember that as a profession, everything we do is for man.

Insofar as I know, there never has been a comprehensively reliable determination of the amount of time the average engineer spends each day in his relationship with people, as compared to the amount devoted purely to engineering tasks. If such determination is ever made it had better be classified "top secret." We shouldn't chance the frustration and disillusionment the facts might (Continued on page 90)

**Scarcity of surface water
prompts use of . . .**

Air Coolers for Condenser Service



PROCESSING UNITS AT CELANESE CORPORATION OF AMERICA'S PAMPA, TEXAS, PLANT

Twenty-six huge air coolers handle approximately 80% of plant's total cooling load. Total heat dissipated is 229,400,000 Btu/hr. Air cooler design features stainless steel headers and tubes and aluminum fins.



COVERING a total of some 630 acres and designed for full-scale operation 340 days a year, the Pampa, Texas, plant of the Celanese Corporation of America produces acetic acid, acetic anhydride and their derivatives from light petroleum gases.

Production at Pampa is based upon an entirely new "continuous" process developed at Celanese Corporation's Clarkwood Research Laboratory Center at Clarkwood, Texas. Process involves the direct-catalytic air-oxidation of natural gases—primarily normal butane—to produce a mixture of organic chemicals which can then be

LOCATION adjacent to processing units made it necessary to mount the air coolers 35 ft above the ground. As plant is situated in relatively high-velocity wind area, units were mounted on channels, beams and angles, which were oversized and carefully load-rated.

separated into its various components.

Most Distinctive Feature

Scarcity of surface water in the Pampa vicinity was responsible for what is perhaps the plant's most distinctive feature—the operation of one of the largest single installations of air-cooled condensers in the world.

Air coolers handle approximately 80% of the Pampa plant's total cooling load. The units were specially designed and built by the Alco Products Division, American Locomotive Company, to meet the requirements of petrochemical production in general and of the Pampa plant in particular. Not the least of these requirements is efficient, dependable operation at pressures of 900 psi in the constant presence of highly corrosive acids, chemicals, and gases—a requirement which was met by the use of aluminum-finned stainless steel tubing. The aluminum fins counteract the corrosion of sour gas, and the stainless tubing resists the corrosiveness of the acetates.

Air Cooler Design

The Alco air coolers are used primarily as process condensers, with condensing temperatures ranging from about 160 F to 250 F.

The total heat dissipated is 229,400,000 Btu/hr. To accomplish this a total of 52 four and six blade fans discharge 4,200,000 cfm of air, requiring 1648 bhp.

Celanese engineers standardized on two sizes of finned-tube exchanger bundles—one 4 ft x 24 ft, the other 8 ft x 24 ft. Each of the 57 bundles furnished is made

AIR COOLERS are used primarily as process condensers, with condensing temperatures ranging from about 160 to 250 F. Units are mounted in 17 ft x 24 ft induced-draft housings, each equipped with two Monel fans mounted on silicon rubber. Air coolers were designed and built by the Alco Products Division, American Locomotive Company.

With permission of the Celanese Corporation of America and the American Locomotive Company, this material has been adapted from the Fall, 1953, issue of the ALCO PRODUCTS REVIEW.

up of four banks of stainless steel tubes 1 in. in outside diameter. The tubes have nine $\frac{1}{2}$ in. aluminum cooling fins per inch of length, giving them a ratio of outside tube area to inside tube area of approximately 16 to 1.

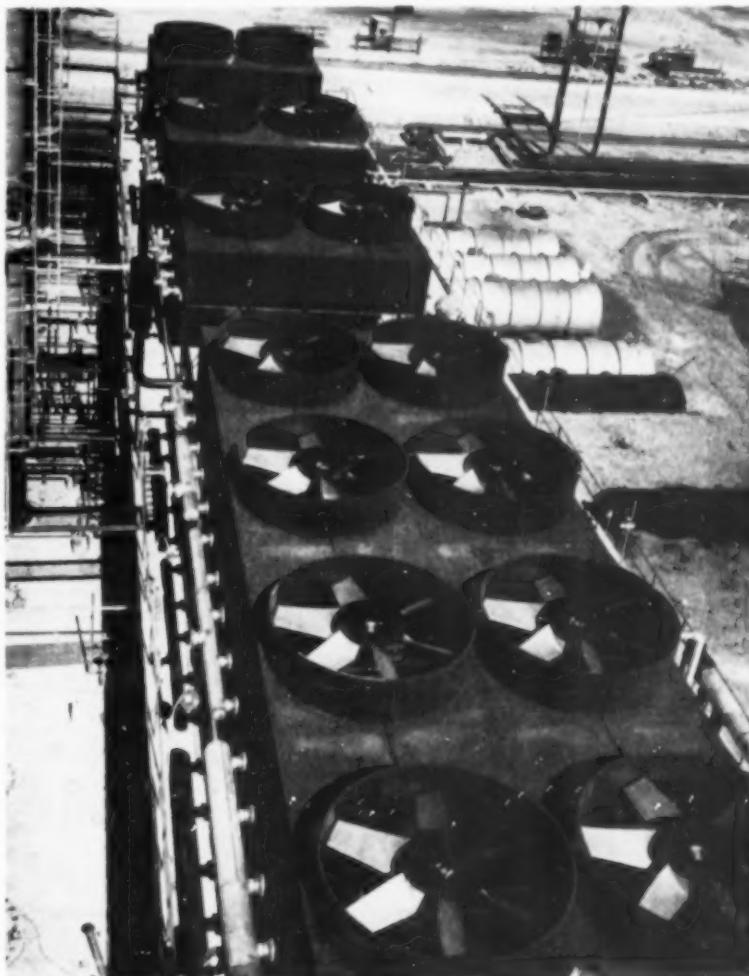
Each air cooler unit consists of two, three, or four tube bundles mounted in a specially designed induced-draft housing. The housings are approximately 17 ft wide and 24 ft long, and in most cases have been erected side by side to give continuous banks.

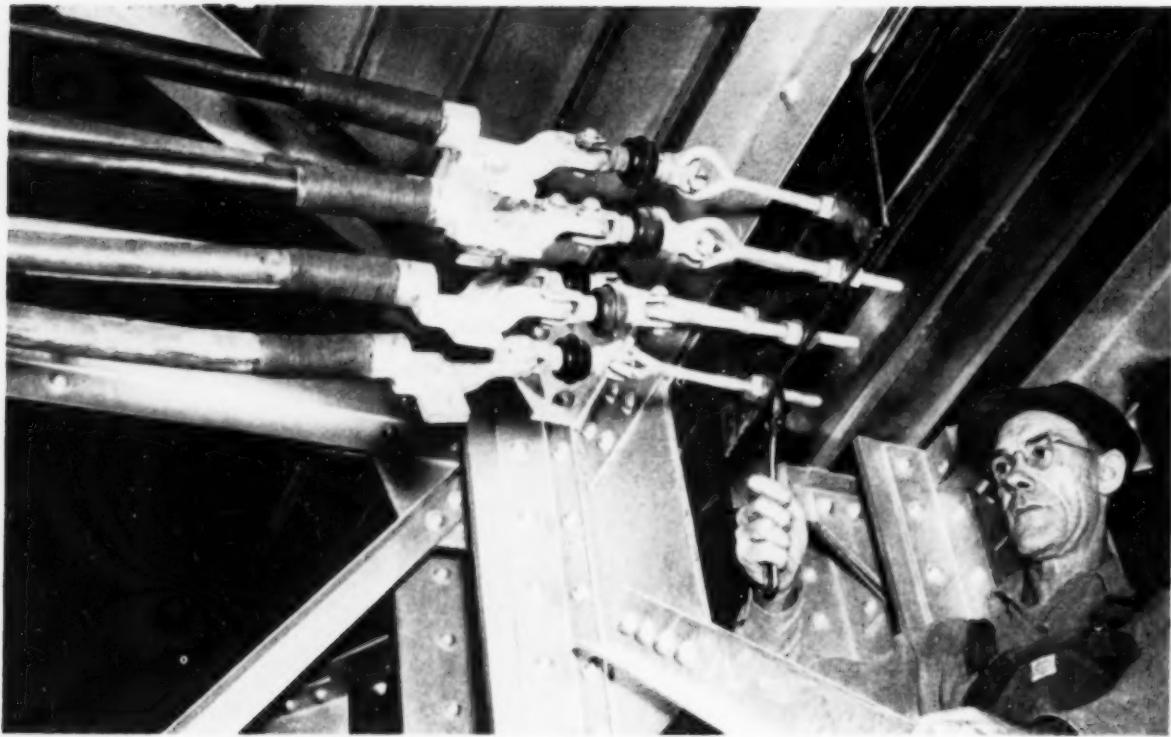
Each housing is equipped with two 11 ft 4 in. Monel fans, which are mounted on silicon rubber for quiet operation and maximum ventilating efficiency. One fan in each housing is driven through gear reducers by a 30 hp, single speed, 1800 rpm electric motor; the other by a vent-gas turbine operating on the nitrogen left in the oxidation

air during the plant's reaction step. This type of arrangement permits air rates and process temperatures to be controlled in accordance with seasonal variations in ambient air temperatures.

Dimensions of the housings and exchangers have been selected so that 4 or 8 ft bundle widths—or combinations of these—may be used. The housings themselves have been designed so that tube bundles can be removed simply by sliding them out on their stainless steel channel frames.

Location adjacent to processing units made it necessary to mount the air coolers 35 ft above the ground. This presented another problem—as Pampa is situated in a relatively high-velocity wind area. The problem was solved by mounting the air coolers on channels, beams and angles which were oversized and carefully load rated.





DEAD-ENDING open aluminum cable feeders with welded aluminum lugs. 1,000 mcm aluminum cable.

Aluminum Conductors

Successful use an engineering rather than substitution job . . . power and feeder cable . . . transmission and distribution . . . plant tested joining and terminating techniques

UNDER present economic conditions, and considering the future supply of basic materials, aluminum is gaining considerable headway as a material for electrical conductors, both in the transmission field and in the field of insulated electrical power conductors. The supply prospect for aluminum and its economic position with respect to copper indicate for the future a steady increase in applications of aluminum electrical conductors.

Electrical conductor grade (EC) aluminum is a ductile metal having a conductivity of 61% of the International Annealed Copper

By R. R. COPE

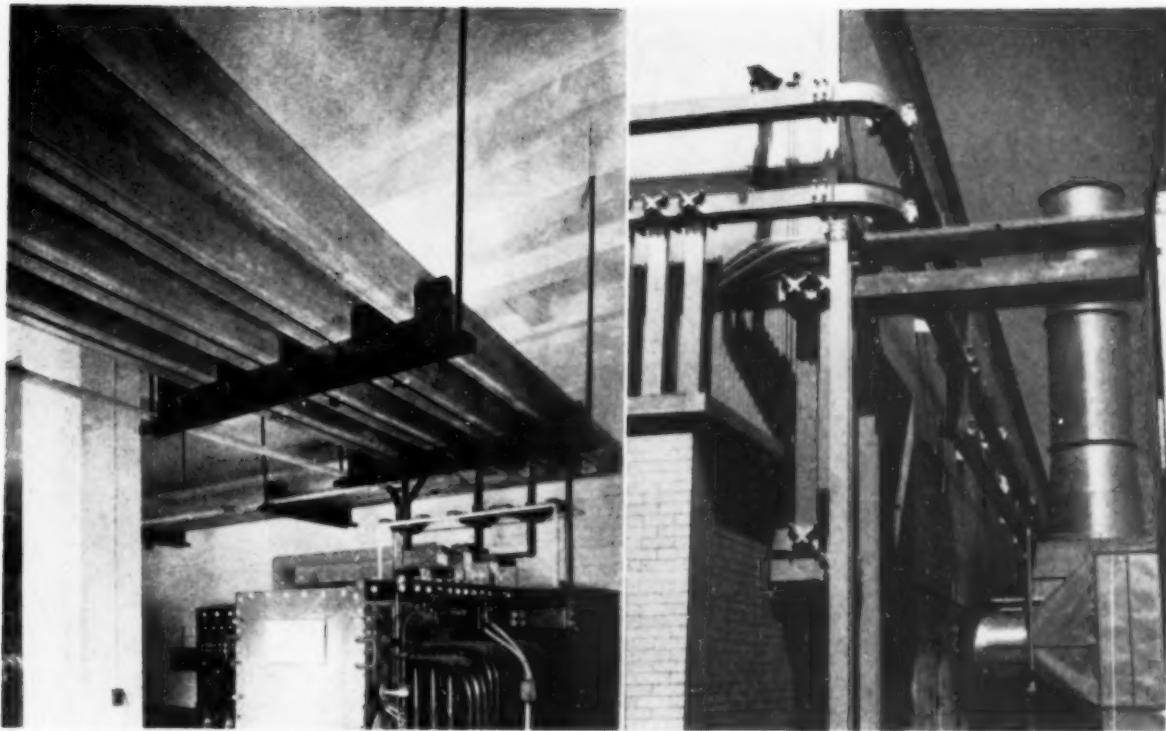
Head, Electrical Section
Development Division
Aluminum Company of America

Standard (I.A.C.S.). Tensile properties of EC aluminum are dependent upon the amount of cold work to which the metal is subjected. EC aluminum can vary in tensile strength from 30,000 psi for hard drawn material to 12,000 psi for annealed material.

Aluminum, like copper, will oxidize when exposed to air. The oxide film on aluminum is highly protective, which accounts for the excellent resistance of the metal

to corrosive environments. The extremely thin coating of aluminum oxide that forms when aluminum is exposed to air clings very tenaciously to the metal instead of flaking off. It is this tenacious oxide coating on aluminum, clear in color, which makes aluminum more difficult to connect and terminate. To effect a satisfactory joint on aluminum, this oxide must be removed or broken up in such a way that the conductor metal can actually come in intimate contact with the connector applied to it.

In most electrical circuits involving aluminum conductors, the aluminum will be called upon to



EIGHT-INCH aluminum channel bus supplying power in the Apex Building, Washington, D. C. Outside view (right) shows one of three powerhouses at the Point Comfort (Texas) Works of Alcoa. Aluminum bus conductor carries power to pot rooms.

APPLICATIONS of aluminum electrical conductors illustrated in this discussion include installations at:

Apex Building, Washington, D. C.
Alcoa, Point Comfort, Texas
TVA—Columbia, Tenn.
San Antonio Public Service Co.
Louisiana Power and Light Co.

perform with existing circuits of copper. Electrolytically, copper and aluminum are far apart in the galvanic series, so that in the presence of electrolytes, galvanic corrosion can occur. It is therefore necessary to design fittings and terminations for aluminum that will be compatible with copper, and vice versa. The problem of galvanic corrosion, however, is not serious because most electrical circuits are protected for insulating reasons by tapes, compounds, or by enclosures or cubicals. Galvanic corrosion can occur only when an electrolyte is present; if circuits are reasonably

dry, no difficulties will be encountered from this cause.

Design System From The Ground Up

The use of aluminum for power and feeder cable differs considerably from aluminum used for transmission and distribution. Power and feeder cable are generally confined by space limitations; therefore, fittings and accessories must be scaled down to fit the dimensional tolerances allocated to the conductors. Transmission cable, on the other hand, is not confined by space limitations and connectors may be as large as is necessary to effect low initial joint resistances.

As mentioned previously, EC aluminum (electrical conductor grade) has a minimum conductivity of 61% of the International Annealed Copper Standard. This means for equivalent current carrying capacity the cross sectional area of the aluminum conductor must be increased by approximately 64% over that of a

copper conductor. The density of aluminum is approximately 30% that of copper, which means that the volume conductivity of aluminum is approximately 200% that of copper; therefore, a pound of aluminum will provide twice as many feet of conductor as a pound of copper, and both conductors will have the same current carrying capacity. For example, one pound of aluminum will make a No. 6 conductor approximately 40 ft long, while a pound of copper will make a No. 8 conductor approximately 20 ft long.

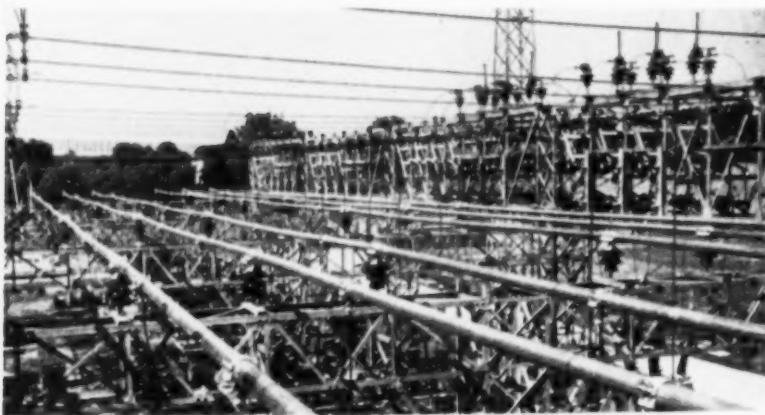
The light weight of aluminum conductor per foot is a factor that influences its use in the design of electrical equipment. Because of its light weight, aluminum conductors can be installed with supports that are less complicated, spaced farther apart, and fabricated from less costly materials. The increased cross sectional area of the aluminum conductor may be a factor in the opposite direction, however, for aluminum conductor will require more insulation than

Aluminum electrical conductors (continued)

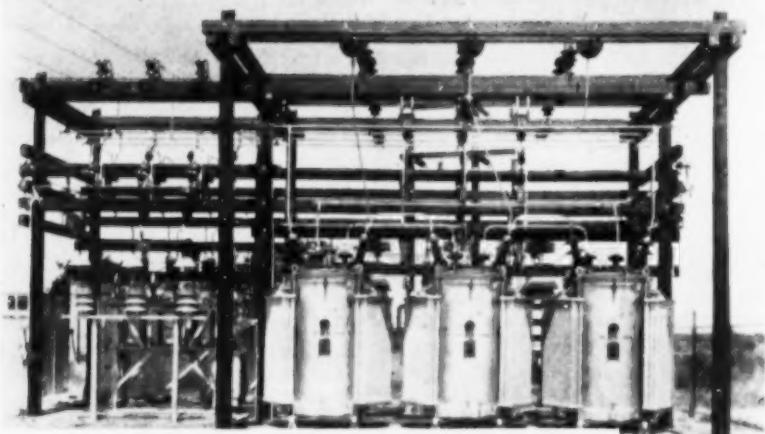
Consider an aluminum design on the basis of aluminum's characteristics rather than on a substituting process. You can then take advantage of aluminum's lower cost, lighter weight and the resultant ease of installation.

does the copper conductor. The overall design of any electrical system is a compromise where one material or the other is selected for particular circuits based upon these various parameters.

For these reasons, an aluminum system should be designed from the ground up. Too often, an electrical system is designed for copper and aluminum sizes are then



LEFT—Aluminum tubular bus, 4½" od, TVA Columbia primary substation, operating at 44 kv. Spans are 40 ft long.

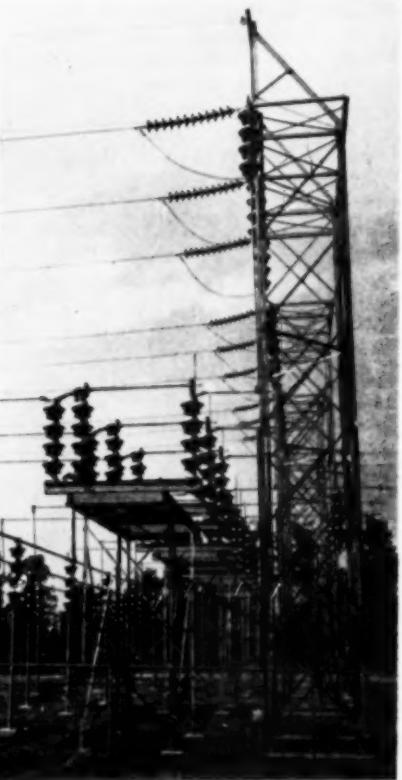


CENTER—Aluminum tubular bus, 1½" ips, operating at the 13.8 kv Cotton Mills substation of San Antonio Public Service Company.



BOTTOM, LEFT—Part of the 4000 volt, auxiliary power distribution system at the Point Comfort (Texas) Works of Alcoa, employs aluminum towers and aluminum cable. Two powerhouses can be seen in the background.

BELOW—Installation of Alcoa tubular bus conductor and fittings at the Jena, Louisiana, 110/13.8 substation of Louisiana Power and Light Company.



DEMONSTRATING the technique of making welded pigtail joint in covered and insulated aluminum conductor. Cover is stripped back and about six turns are made. An aluminum compression sleeve may be used. The joint is grasped near the top with electrode pliers and the weld is made by striking an arc between the wires and the carbon electrode.

ELECTRICIAN (right) makes pressure connection used for aluminum wires up to 4/0 sizes. After wire is inserted into hollow end of aluminum lug, he squeezes lug tight over wire with hydraulic hand tool.

substituted from tables without regard for the savings in installation costs that can be realized because of the light weight of the aluminum conductor.

Over the past 7 to 8 years, a background of experience has built up through many successful installations of aluminum conductors. All of Alcoa's plants built since 1947 are completely wired with aluminum electrical power and feeder cable. Techniques of joining and terminating have been established that will be described in the following paragraphs. The successful use of aluminum electrical conductors is therefore an engineering job and not a substitution job. New tables of current carrying capacities are being prepared which will avoid the past dependence on tables prepared for copper.

Connecting And Joining

Aluminum conductors can be terminated and joined in the same manner as copper conductors—by the use of compression terminals, mechanical terminals, soldering, or welding. All of these various methods have been utilized in Alcoa's Plants and have served well over a rather long period of time.

A compression terminal, for use on aluminum, is made either from aluminum tubing or as a casting having a hollow barrel. This type of terminal is then compressed onto the cable by means of suitable tools. These are plier operated tools for very small conductors;



bolt cutter type tools for larger conductors; and hydraulically actuated tools for very large conductors.

The compression or distortion of the terminal barrel may take several forms. One type of compression, known as the indent, consists of pushing a ball into one side of the terminal barrel; the circumferential crimp is made with a pair of dies which exerts pressure around the periphery of the barrel, resulting in either a circular or hexagonal cross section after compression. As a preliminary to the installation of this type of terminal on aluminum conductors, the use of petrolatum type joint compound to seal out moisture is strongly recommended. These joint compounds are available through the terminal manufacturers and are often sealed into the terminal barrel by the fittings manufacturer.

Mechanical terminals are usually in the form of castings, either aluminum or copper. Copper terminals generally are coated with tin, cadmium, or zinc, for use with either aluminum or copper conductors. Mechanical terminals are generally made in two pieces bolted together by two or more bolts placed on each side of the conductor. A mechanical ter-

rninal, to be successful on aluminum for heavy duty service, should have a relatively long barrel length (2½ or 3 times the cable diameter) and be capable of exerting considerable pressure on the conductor. The pressure should be distributed over a large area so as not to deform the cable. In this type of connection, it is desirable to use a joint compound to ensure low joint resistance. If a copper alloy connector is used, the joint compound also minimizes any possibility of galvanic corrosion.

Soldering is a method of terminating a conductor which is still used to a large extent on copper and which can be successfully employed with aluminum conductors. During the war, Alcoa developed a non-corrosive, organic flux that permits the soldering of aluminum by the same techniques normally used on copper—that is by the use of an iron, torch, dip ladle, or by sweating the parts together. Soft solders for use with aluminum are either lead-tin-zinc solders or zinc-cadmium solders. For soft soldering aluminum conductors, the lead-tin-zinc type solders are generally used since they work better with the non-corrosive flux that has been developed.

Where a large number of ter-
(Continued on page 77)

**Camp Manufacturing Company's new
bleach plant in Virginia . .**

INSTRUMENTATION and UTILITIES

*Utilities, chemical handling, building
design and instrumentation featured in
this highlight report on Virginia plant.*

THE NEW bleach plant of Camp Manufacturing Company in Franklin, Virginia, provides plant engineering personnel with modern control, cleanliness, convenience, good housekeeping, safe working conditions and efficient operation.

The building is constructed of steel, brick and concrete, and occupies an area 75 ft by 117 ft. It is supported on more than 900 piles, 35 ft long with a 3½ ft thick concrete cap.

In keeping with the policy of quality and cleanliness, the walls are provided with a buff colored glazed tile wainscoting, and the floor surfaced with red quarry tile.

Special care has been exercised

to minimize or prevent humid or fume laden air coming in contact with electrical or control apparatus. Panel boards and operating consoles are continuously purged by an independent air supply. The motor control and unit substation rooms are likewise continuously swept by their own independent air supply system. Bleach making and chlorine handling rooms are each provided with their own independent exhaust fans. The principal ventilating system provides filtered air equivalent to six changes per hour in the washer room, panel room, and laboratory. An exhaust system, connected to all six washer hoods, removes approximately 5,000 cfm through each hood. The same exhaust sys-

tem connects to each of the high density towers to prevent escape of steam and fumes into the building. All of the ventilating equipment has sufficient capacity to handle both bleaching lines when completed.

Utilities

Power to operate the bleach plant is delivered to the building at 13,800 volts and transformed to 440 volts by three General Electric 1,000 kva high impedance unit substations. These are housed in the same rooms with the motor control centers, also by General Electric Company. One control room contains two unit substations and control centers for the motors driving

(Continued on page 76)

Planning, Design and Construction Summary

COMPLETION and start-up of the new bleach plant of Camp Manufacturing Company at Franklin, Virginia, is the culmination of several years of careful study and planning on the part of the Company combined with the efforts of its engineers, contractors, and equipment builders. The job of preparing working plans and specifications was undertaken by the J. E. Sirrine Company, Engineers, Greenville, S. C., in December, 1951. By early summer, 1952, preparation of the site and the construction of

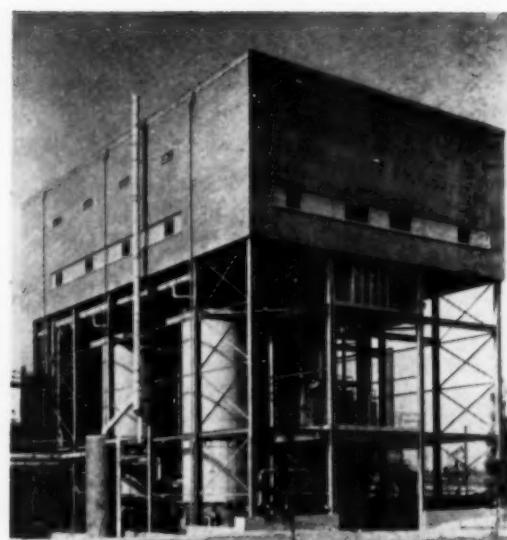
foundations were in full swing. In September, 1953, the plant was completed, and testing and adjusting the equipment began.

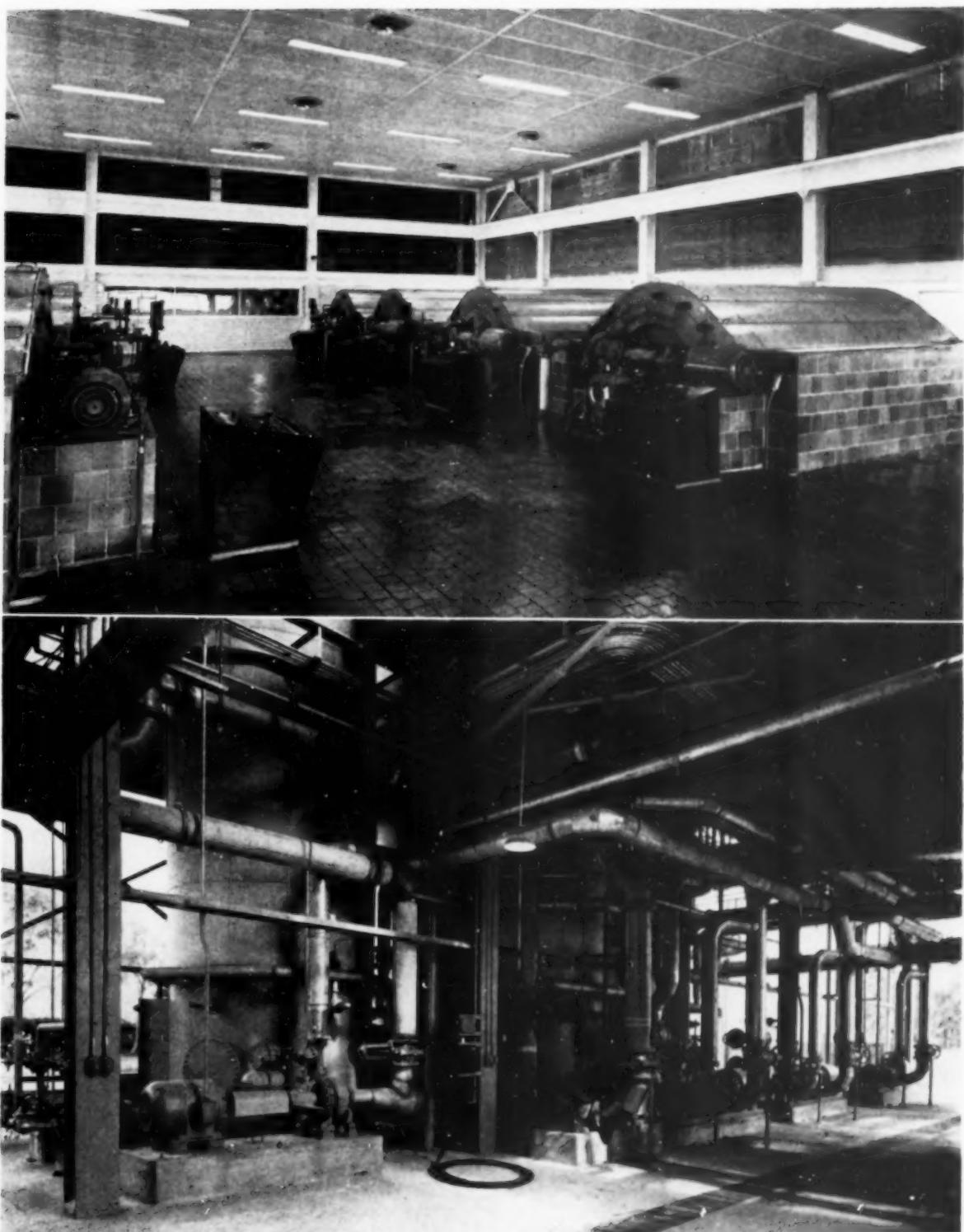
The ultimate program for bleaching, as presently conceived, will provide two complete and independent lines; one for pine, with a basic rated capacity of 250 tons per day of fully bleached pulp, and one line for gum, with a basic rated capacity of 100 tons per day of fully bleached pulp.

With this ultimate aim in mind, the plant as now constructed and oper-

ated consists of two partly completed bleaching lines so arranged that their facilities may be combined to provide full bleaching for 250 finished tons of pine stock, or 100 tons of gum stock, or a combination of 150 tons of pine stock and 100 tons of gum stock. In all instances the gum and pine stocks will be treated in separate chlorination towers, but may be combined in succeeding stages.

Supervision of construction was under the direction of W. C. Coker, Plant Engineer for Camp Manufacturing Company, assisted by A. J. Coleman as Resident Engineer representing J. E. Sirrine Company; with Tidewater Construction Company of Norfolk, Virginia, as General Contractors.





FROM OPERATING FLOOR to the roof (see top photo) the building is completely enclosed with walls of brick and glass block. This enclosure houses washers, instrumentation and electrical control panels, laboratory, stock meters, and heating and ventilating equipment. A transite ceiling, with flush type fluorescent lighting

fixtures, is suspended from the roof trusses. Attic space between ceiling and roof acts as a plenum chamber for the fresh air supply.

THERE ARE NO EXTERIOR WALLS from ground to the operating floor (lower view), a distance of 60 ft.

Design Features of New Virginia Plant (Continued)

pumps, circulators, air compressor, and miscellaneous electrical equipment on the ground floor and lower half of the building.

The other control room houses one unit substation, control centers for driving mixers, ventilating equipment and other electrical equipment on the upper floors. Also housed in this room are the package power supply units for the variable speed drives on washers and stock meters. These units and the d-c motors they operate were furnished by Louis Allis Company.

Cold fresh water is supplied to the bleach plant directly from the pulp mill headers. A portion of this water is re-pumped in the bleachery to furnish high pressure for the wire cleaning showers. Another portion is put through heaters to provide hot water for washing showers. All water is metered.

Steam for heating the water and for heating the stock in the pulp mixers is also obtained directly from the pulp mill headers. This is supplied through a single line provided with a recording flow meter by which the total

steam consumed by the bleachery may be measured.

Compressed air for instrumentation is supplied by an Ingersoll-Rand 7" x 7" ES-1 compressor, complete with aftercooler, receiver, and other accessories, installed on the ground floor.

Chemical Handling

Special spur tracks were built to accommodate chlorine and caustic cars. Caustic is received as a 50% solution and pumped from the tank car to storage tanks in the causticizing building. Automatic dilution equipment was installed adjacent to these storage tanks for reducing the strength of the caustic solution from 50% to 5%. Storage tanks are also provided in the causticizing building for the 5% solution, from whence it flows by gravity to pumps on the ground floor of the bleach plant. These pumps deliver the caustic to the hypo making room on the second floor and the pulp mixers in the caustic extraction stages. Consumption is metered and recorded.

Chlorine is received in liquid form in tank cars and delivered to

the bleach making room on the second floor by padding the car with dry compressed air. Since the flow of chlorine must be uninterrupted every precaution has been provided to assure a steady supply. Two tank cars are always on track and connected up, except during the short period required to remove an empty car and bring up a full one. Automatic signal devices warn the operators whenever the car from which chlorine is being drawn approaches the empty mark. Switching from one car to another is only a matter of seconds.

Instrumentation

On the mezzanine above the operating floor are located two Impco stock motors equipped with DeZurik consistency regulators. One, a 28 in. meter, is for measurement of the gum stock delivered to the bleachery. The other, a 60 in. meter, also equipped with a DeZurik regulator, measures the pine stock delivered to the bleachery. Each meter is provided with an automatic level control and tonnage recorder. Both are driven by variable speed motors and are operated automatically from the main control panel in the control room on the washer floor. Unbleached stock from storage is delivered to the meters by Allis-Chalmers stock pumps through transite pipe lines. From the meters the stock flows by gravity to the base of the chlorination towers at a consistency of 3½% (air dry).

Each stage in the bleaching process is controlled from a console panel in front of the washer for that stage. All motor push buttons, valve controls, pressure gages, flow indicators, and speed controls necessary to start up, operate, or shut down one complete stage are located on that console. In conjunction with each console, any necessary records of flows, temperatures, levels, or consistency are made on chart recorders mounted on the main instrument panel in the glass enclosed room.

As a further aid to the operator, a graphic panel, representing in

PRINCIPAL ERECTION AND EQUIPMENT CONTRACTORS

Engineers—J. E. Sirrine Company, Greenville, S. C.

General Contractors—Tidewater Construction Company, Norfolk, Va.

Piping Contractors—Wm. H. Singleton Co., Inc., Richmond, Va.

Electrical Contractors—Bryant Davis Company, Greenville, S. C. and Lucas Electric Company, Knoxville, Tenn.

Structural Steel and Miscellaneous Iron—Richmond Structural Steel Co., Inc., Richmond, Va.

Washers, Stock Meters, Mixers, Circulators, and Misc. Equip.—Improved Machinery Inc., Nashua, N. H.

File Chests, Linings, Washer Vats, Seal Boxes—Stebbins Engineering & Mfg. Co., Waterbury, N. Y.

Steel Tanks and Bleach Towers—Gary Steel Products Corporation, Norfolk, Va.

Rubber Linings & Misc. Rubber Coverings—Raybestos Manhattan, Inc., Passaic, N. J.

Heating and Ventilating—J. O. Ross Engineering Corporation, New York, N. Y.

Painting—Shaw Paint & Wall Paper Co., Norfolk, Va.

Pumps—Allis-Chalmers Mfg. Company, Milwaukee, Wis.

A-C Motors, Controls, and Unit Substations

(G.E.)—Electrical Equipment Company, Richmond, Va.

D-C Motors and Variable Speed Drives—The Louis Allis Company, Milwaukee, Wis.

Instrumentation and Process Control Equipment—Minneapolis Honeywell Regulator Co., Philadelphia, Pa.

Elevator—Southern Elevator Company, Greensboro, N. C.

Traveling Crane—Manning, Maxwell & Moore, Inc., Muskegon, Mich.

Stock Chest Agitators—Dilts Machine Works, Fulton, N. Y.

Consistency Regulators and Control Valves—DeZurik Shower Company, Sartell, Minn.

Stock Valves—Crane Company, Richmond, Va., Record Foundry & Machine Co., Livermore Falls, Maine.

General Purpose Valves—Walworth Company

Transite Pipe, Insulation, Flexboard, Transite Fittings—Johns-Manville, New York Street Fabricating Co., Inc., Atlanta, Ga.

Corrugated Metal Pipe—Armcro Drainage & Metal Products Inc., Richmond, Va.

Stainless Steel Pipe & Fittings—Rodman H. Martin Co., Philadelphia, Pa.

Instrument Air Compressor—Ingersoll-Rand Co., Phillipsburg, N. J.

Miscellaneous Materials—Noland Company, Richmond, Va., Empire Machinery & Supply Corp., Porcile Mfg. Company, North Arlington, N. J.

symbol each and every major piece of equipment and pipe line, has been provided as a section of the main panel. All the equipment comprising each stage is grouped by color scheme to represent the portion of the process controlled from each washer console. All the levels, pressures, flows, or other operating data are indicated. A red light on each pump, washer, circulator, or other piece of moving equipment indicates whether or not that item is in operation. No control or recording equipment is included on the graphic panel, it being solely an indicator of what equipment is in operation and how it is performing.

In addition to the main control panel, an auxiliary panel known as an accounting panel has been provided. On this are mounted recording and totalizing instruments for total steam, cold water, hot water, and stock furnished to the bleach plant. Starting push buttons for remote operation of bleach liquor supply pumps and miscellaneous items complete this panel. No expense has been spared to obtain precise control and eliminate wasted man power in designing the instrumentation for this plant. Practically all the instruments and panels were furnished by the Minneapolis-Honeywell Regulator Company.

in which lengths of conductors are terminated by various methods, bolted back to back in series, and then subjected to alternate cycles of current and cooling.

For example, a 500,000 circular mil aluminum cable with RH insulation would be subjected to a current of 536 amperes for a period of perhaps 4 hours, and then allowed to cool to room temperature. Connectors terminating such a cable might be subjected to as many as 600 or 700 such duty cycles. During this type of accelerated test, temperatures are recorded continuously and resistance measurements taken periodically. From data obtained in these tests, fairly accurate predictions can be made concerning the performance of other connectors of similar design.

Alcoa has carried out extensive tests on connectors manufactured by various fittings manufacturers and has made data available to each of the manufacturers on their own fittings. As a result of this test work, there are now a number of commercial fittings which carry Underwriter's Laboratories listings for use on aluminum conductors and which will perform satisfactorily for very heavy duty use.

The following bibliography lists some current information available on aluminum conductors.

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"Insulated Aluminum Cables in Industrial and Utility Applications," E. E. McIlveen, Okonite Company, Passaic, N. J.

"The Use of Aluminum Conductors for Insulated Power Cable," E. E. McIlveen, Okonite Company, Passaic, N. J.—Progress Report, Research Publication 113.

"An Experimental Investigation of the Electrical Performance of Bolted Aluminum to Copper Connections," J. W. Bonwit, Barnaby Engineering Company, Norwalk, Conn.—AIEE Technical Paper 48-216.

Note: Materials listed by Alcoa personnel are available from Aluminum Company of America, 1201 Alcos Bldg., Pittsburgh 19, Pa.

Aluminum Electrical Conductor

(Discussion starts on page 70)

Power and feeder cable . . transmission and distribution . . joining and terminating techniques.

minations are to be made (for example, in large industrial plants or multi-story buildings), welding offers one of the best means for joining an aluminum terminal to an aluminum conductor. These terminals are generally cast from conductor grade metal. The welding is done by the inert gas shielded arc method or by the use of a consumable aluminum electrode protected by an inert gas such as argon or helium. In this type of welding, no fluxes are employed and all the strands are welded to each other and to the side wall of the terminal. Alcoa uses this type of joining method for all aluminum cables larger than 300,000 circular mils.

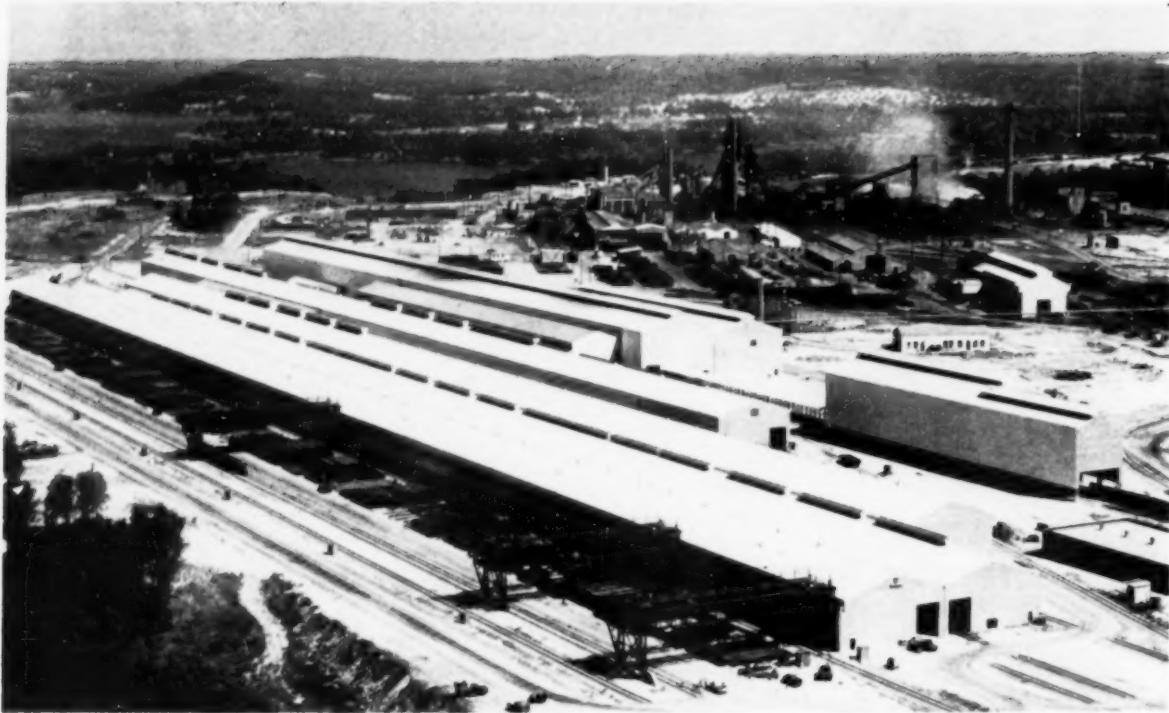
Cold welding of aluminum is of considerable interest to many electrical engineers, since it provides a convenient and satisfactory means of joining some electrical conductors. There is no cast metal in a cold welded joint since no melting has taken place. This type of welding is done by the application of high unit pressure sufficient to cause a cold flow of the two aluminum pieces being joined.

Tools have been developed which permit lap welding of sheet,

and lap or butt welding of wire. In making lap welds of sheet or wire, pre-treatment by scratch-brushing of the surfaces is required and the deformation necessary to effect sufficient cold flow of the metal is about 70% of the original metal thickness. This deformation is undesirable in many applications because of stress concentrations at the point of deformation and because of the attendant weakness in fatigue and bending. This difficulty has, of course, been overcome in the butt welding of joints since there is no decrease in the cross sectional area and the flash can be removed after the weld has been made.

In 1927, Alcoa established at Massena, New York, an aluminum conductor laboratory, now the Electrical Engineering Division of Aluminum Research Laboratories. This laboratory has recently developed methods for evaluating various type of connections involving aluminum conductors, and aluminum-to-copper conductors.

A major portion of the research program is devoted to the study of the connectibility problem with respect to aluminum. Out of this work has come the heat cycle test



Lone Star Steel Company's completely integrated steel plant in East Texas. Electric weld pipe mills and rolling mill in foreground; cast iron pipe foundry, power house, blast furnace, coke ovens, and by-products plant in the background.

Power for Lone Star Steel—Texas

Needed supply for \$87 million steel mill expansion program, complicated by Navy power requirements, was provided by new unit and public utility tie-in.

By DAVID C. PFEIFFER

Consulting Engineer
Dallas, Texas

THE first unit of what is now the Lone Star Steel Company at Lone Star, Texas, was built by the D. P. C. in 1942-43 and consisted of one 1200-ton blast furnace and a by-products plant. The original power plant consisted of four boilers having a total nominal capacity of 425,000 lb/hr at 400 psig and 750 F, and two turbine generators with total capacity of 17,500 kw.

Three fuels are used: natural, coke oven and blast furnace gas. The automatic combustion control is so arranged that all blast furnace

gas available will be burned first; then coke oven gas; and finally natural gas as required to produce the steam load. A small amount of natural gas must be burned continuously with the blast furnace gas but the former is kept at a minimum.

Existing Equipment

The original generating equipment consisted of a Westinghouse 10,000 kw, .8 pf, 10,000 volt reaction type turbine generator and a G-E 7,500 kw, .8 pf, 4,160 volt unit. Each

generator was connected to its own steam condenser.

Original equipment also included one Ingersoll-Rand 100,000 cfm blast furnace blower driven by a 11,000 hp condensing type steam turbine.

Transformers stepped the voltage up or down to a 7,200 volt, 3 phase Delta system which was used for general plant distribution. A 3,000 kva transformer supplied 440 volt, 3 phase, 60 cycle a-c current for plant auxiliaries. Lighting and small motors were served at 120/208

volt, 3 phase, 4 wire from smaller transformers.

A 13 cell, 52,000 gpm induced draft cooling tower furnished cooling water for the condensers—reducing temperature from 110 F to 90 F, with 77 F wet bulb temperature.

In 1946 the U. S. Navy contracted with the Lone Star Steel Company for the purchase of utilities to operate the Ordnance Aerophysics Laboratory at Daingerfield, Texas. The Navy housed two additional steam turbine driven blowers in a power plant addition. As Lone Star had never operated the blast furnace, the Navy also made use of the existing Ingersoll-Rand blower.

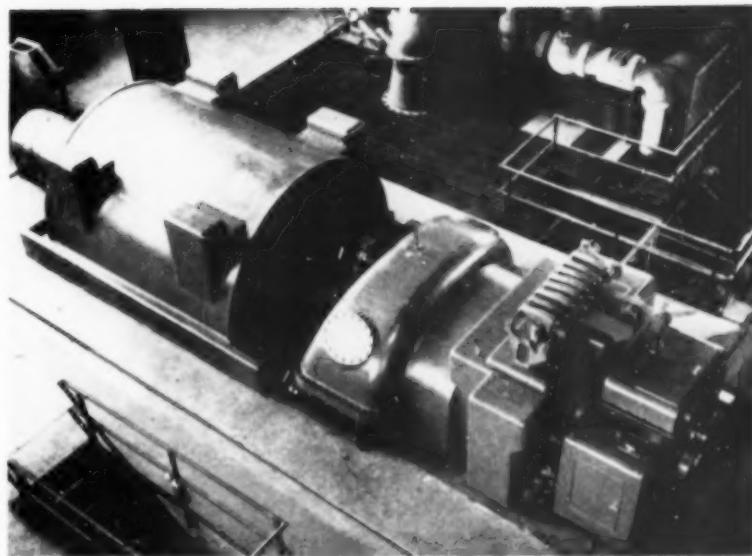
After the blast furnace was put into operation the original boiler plant was unable to meet the combined steam requirements of the Navy and Lone Star Steel, using blast furnace and coke oven gas. Therefore, additional capacity was obtained by using all natural gas and wasting the blast furnace gas. While boiler capacity was increased to approximately 500,000 lb/hr, this procedure was not desirable from an economy standpoint.

Expansion Program

In 1948 Lone Star Steel's \$87 million expansion program was being planned. An analysis of the expected power load from the new steel mill made by A. J. Boynton & Co., indicated that the average 15 min. demand for electrical power would be approximately 23,000 kw, with short time peaks considerably higher due to the reversing motor on the Strip Mill. Total maximum peak was estimated at 39,594 kw.

Direct current for the Reversing Strip Mill was to be supplied by a motor generator set consisting of one 8,500 hp a-c synchronous motor drive and two 3,000 kw, 700 volt d-c generators. Expected characteristics of the motor (illustrated) indicate a possible maximum instantaneous peak of 12,500 kw.

To serve this load additional generating facilities were needed. Consideration was given first, to building a completely new 40,000 kw steam electrical plant located at the lake approximately 2,000 feet from the older power plant; and second, the possibility of increasing



This new G-E 15,000 kw turbine generator replaced an old 7500 kw unit. Former turbine generator foundation was modified to accommodate the new unit.

capacity in the existing plant and supplementing its output with purchased power from the Southwestern Gas and Electric Company.

Negotiations with the Southwestern Gas and Electric Company indicated that the Daingerfield area was a logical place for erecting a power plant to stabilize their system in the area. But a study of the existing steel mill power plant disclosed that the original design of the condensing water system placed definite limits on economical expansion at that site.

A cost analysis indicated, however, that the old G-E 7,500 kw turbine generator (built in 1912) could be replaced with a new 15,000 kw unit having a maximum capac-

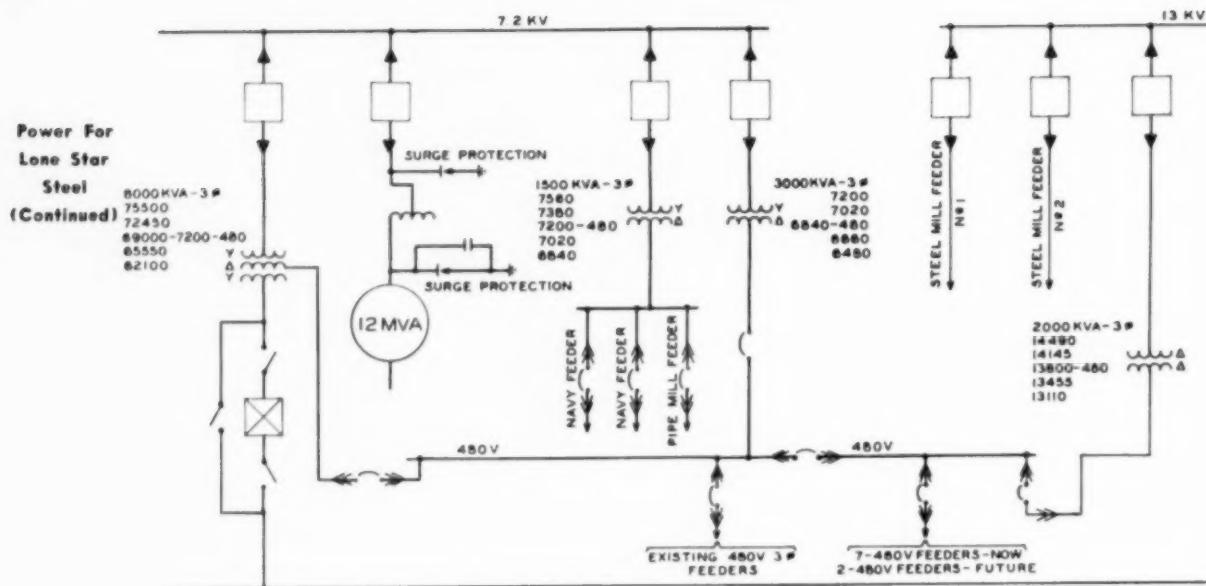
ity of 20,000 kw. This new unit would have a steam rate of approximately 10 pounds of steam per kwh as compared with the steam rate of 18 pounds per kwh for the old turbine generator.

The investigation also disclosed that the existing turbine generator foundation could be modified to accommodate the new unit, and that with minor changes the existing steam condenser and its auxiliaries could be utilized. The new 15,000/18,750 kw turbine generator could be installed for approximately \$100 per kw, and due to the higher efficiency of the new unit very little additional steam would be required. Actual costs later verified this estimate and the unit was installed for

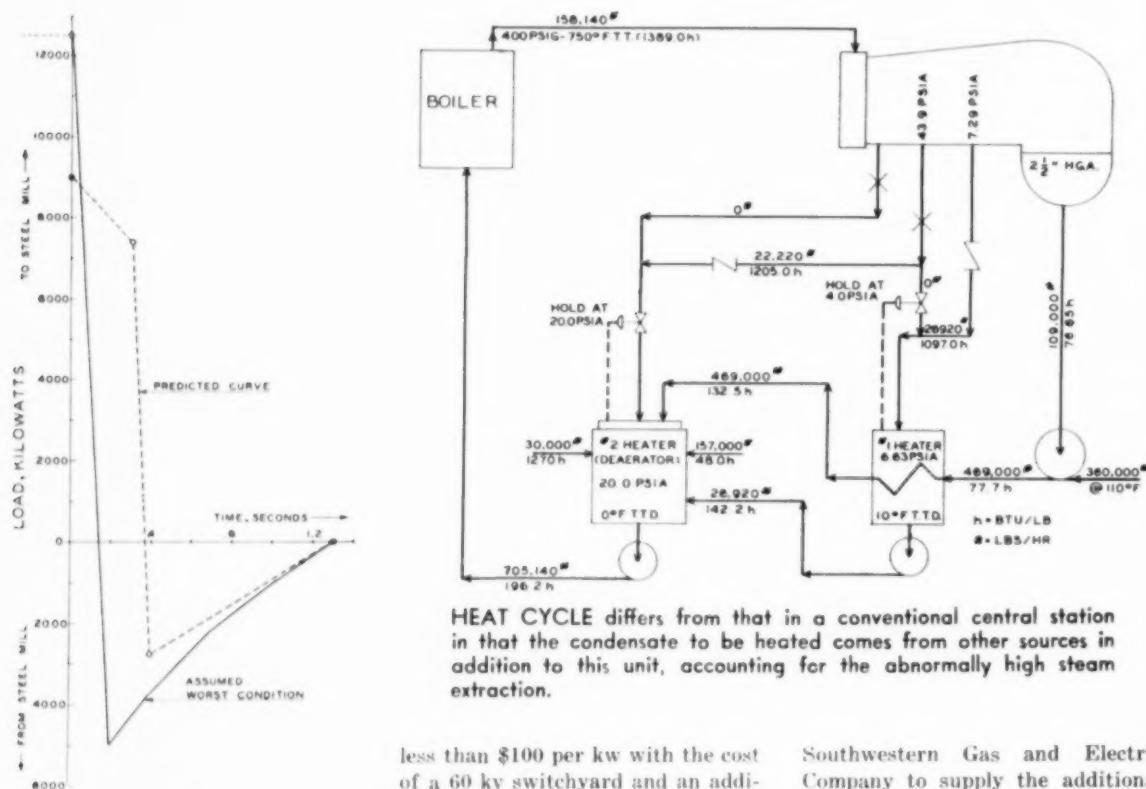
Lone Star's Integrated Mill in Full Production

Lone Star Steel Company's completely integrated steel mill (the E. B. Germany Works), at Lone Star, Texas, some 150 miles east of Dallas, includes facilities for the annual production of 500,000 tons of basic open hearth ingots from which 350,000 tons of casing, tubing, and line pipe are now being produced.

Processing facilities include ore beneficiation and by-product coke plants, blast furnace plant, four open hearth furnaces, soaking pits, blooming and slabbing mill, skelp mill, pipe mills and pipe finishing facilities, ingot mold foundry and cast iron pipe foundry. Lone Star's operations are based on low grade East Texas iron ores, on high volatile and medium low volatile coals from Southern Oklahoma and on Texas flux stone.



SIMPLIFIED ELECTRICAL DIAGRAM OF PLANT



HEAT CYCLE differs from that in a conventional central station in that the condensate to be heated comes from other sources in addition to this unit, accounting for the abnormally high steam extraction.

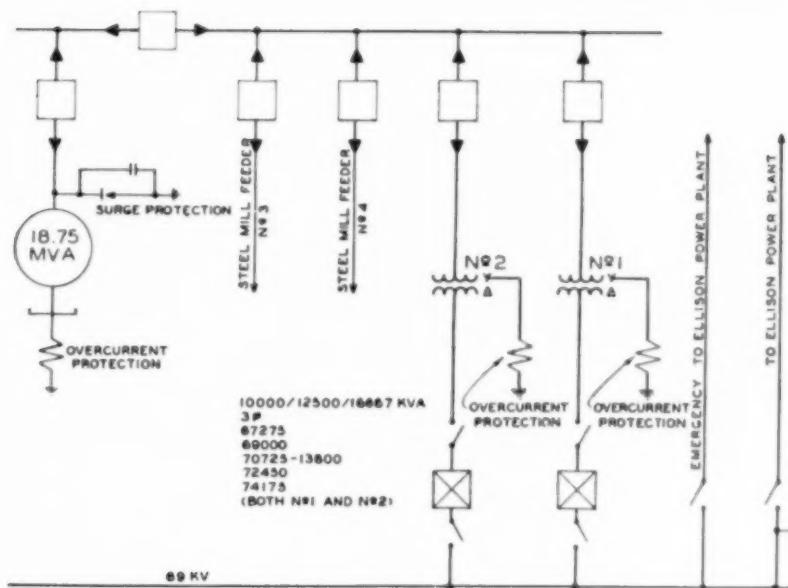
less than \$100 per kw with the cost of a 60 kv switchyard and an additional boiler excluded.

New Power Equipment

It was decided to install one 15,000/18,750 kw steam turbine generator in the existing power plant and purchase 10,000 kw from

Southwestern Gas and Electric Company to supply the additional power needed for the new steel mill. The existing blast furnace and Navy load can be taken care of by the 10,000/12,500 kw Westinghouse turbine generator with approximately 4,000 kw left available for the steel mill. The Southwestern

UNUSUAL load swings, as indicated by graph of hot strip mill load variation at end of rolling cycle, are handled by special load control system. Highly sensitive motor opens or closes all turbine steam valves in less than 4 seconds.



Gas and Electric Company is building a 40,000 kw plant at the Dainerger Lake. Arrangements for purchasing 10,000 kw from this plant to serve the steel mill have been made.

Because of the unusual load swings expected from the 8,500 hp synchronous motor in the strip mill and the 4,000 kw electrical welder, special provision was made for taking care of these swings by the installation of a special load control system.

The governor used was developed by the General Electric Company for similar installations in other steel mills and consists essentially

of a highly sensitive motor which has the ability to open or close all turbine steam valves in less than 4 seconds. This highly sensitive and very fast acting governor materially reduces the effect of load swings in the steel mill and on the outside electrical system which, unless minimized would result in undesirable voltage variations in the surrounding area. The 15,000 kw G-E turbine of Lone Star Steel Company and the 40,000 kw G-E turbine of Southwestern Gas and Electric Company are each equipped with this special governor. Each governor is set to take its proportionate share of any load swing.

The steel mill is served by four 13 kv feeders as shown in the accompanying single line diagram. Power is purchased from the Southwestern Gas and Electric Company at 60 kv and stepped down to 13 kv through two 10,000/16,600 kva transformers. These transformers have sufficient capacity to permit purchasing of the entire electrical requirements if desired.

The Lone Star Steel Company's new 15,000 kw turbine generator is designed for 13 kv and is tied directly to the steel mill feeders and to the transformers through indoor type metal clad switch gear. The tie between the 13 kv system and the 7.2 kv system is through a 60 kv switching station and transformers. A new indoor house service transformer bank of 2000 kva and necessary control cubicles were installed.

The 60/13 kv power substation is compact and attractive in design. The structure is fabricated of galvanized structural steel towers and connecting trusses. Each tower is provided with a tapered structural steel shield wire mast to support the $\frac{3}{8}$ in. steel shield wire grid that covers the entire station for protection from direct lightning strokes.

The station busses are of the strain type made from heavy bare copper cables installed between trusses of the station structure. The design will permit two 60 kv buses connected through a bus tie breaker. A 60 kv main line and a

(Continued on page 112)

PRINCIPAL EQUIPMENT—Plant Extension 1

Lone Star Steel Company, Lone Star, Texas

STEAM GENERATORS

Boilers	Two—Babcock & Wilcox Co. Radiant type, 225,000 lb steam per hour, 450 psig—750 F, on natural gas, 150,000 lb steam per hour on blast furnace gas
Superheaters	Babcock & Wilcox Co.
Air Heaters	Babcock & Wilcox Co., tubular type.
Soot Blowers	Diamond Power Specialty Corp.
Forced Draft Fans	Sturtevant, damper controlled steam turbine driven
Induced Draft Fans	Sturtevant, damper controlled steam turbine driven
Combustion Controls	Bailey Meter Co., 3 fuels, serving both boilers
Stacks	Babcock & Wilcox Co., steel

TURBINE GENERATOR

Turbine Generator	One—General Electric Co., 15,000/18,750 kw, condensing, extraction, 400 psig, 750 F, throttle steam, $2\frac{1}{2}$ Hg abs exhaust, 3 bleed points, 3600 rpm, hydrogen cooled, 18,750 kva, 1.0 power factor.
Condenser	One—C. H. Wheeler Co., 14,000 sq ft surface, two pass, Admiralty tubing
Circulating Pumps	Two—C. H. Wheeler Co. Each 3,000 gpm, horizontal. Driven by 75 hp, 440 volt motors

Condensate Pumps	Two—C. H. Wheeler Co., 275 gpm each, driven by 25 hp 440 volt motor
Air Ejector	One—C. H. Wheeler Co., steam jet, twin 2-stage

AUXILIARIES AND MISCELLANEOUS

Boiler Feed Pumps	Two—Ingersoll-Rand, 750 gpm, motor driven
Boiler Feed Pump Drives	Two—General Electric Co., 200 hp, 3600 rpm, 440 volt, 3 phase
Feedwater Heaters	One—Griscom-Russell Co., closed type low pressure heater, designed for heating 169,000 lb of water per hour from a temperature of 110 to 170 F with steam at 7 psia
Piping Contractor	Brown and Root
Steam Piping Insulation	The Riwil Co.

SUBSTATION EQUIPMENT

Main Control Board	General Electric Co., duplex type, all breakers remote
Switchgear	General Electric Co., indoor metal clad, 13 kv, 8 cubicles, drawout type
Switchgear	Westinghouse Electric Corp., indoor house service transformer and breaker, cubicle, 2,000 kw with nine 440 volt breakers
Transformers	Two—Westinghouse Electric Corp., 10,000/16,700 kva—60/12 kv
Oil Circuit Breakers	Three—Allis-Chalmers Mfg. Co., outdoor

ENGINEERING SERVICES

Design and Engineering	D. C. Pfeiffer & Associates, on power plant
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Improved handling of incoming shipments . . .

Palletized Purchases

Studies at Convair in Texas show how improved material packaging pays off.

AN EXTENSIVE campaign to improve packaging and handling methods for incoming shipments of various materials is being conducted by the Receiving and Stores Section at Consolidated Vultee Aircraft Corporation in Fort Worth, Texas.

To date, two important improvements are saving time and money and reducing damage to the materials handled. Improvements cover carload shipments of paper towels and both car and truck shipments of plywood.

According to *W. B. Watkins*, Receiving and Stores General Fore-

man, the method of banding plywood described below has cut the time of unloading a car from 32 to 2 hours. Shipping of paper towels on disposable pallets has enabled the unloading of a car and stacking in the warehouse in one standard hour by use of fork lift truck.

Handling Plywood

Previously plywood was shipped by stacking the loose sheets in car or truck with 2 x 4 separators every 2 to 4 ft of height. A carload consists of approximately 3200 sheets on an average and upon receipt the cargo was usually found to have

PALLETIZING by vendor permits efficient handling with fork trucks.

shifted around, making the plywood difficult to handle and damaging a number of sheets. Unloading by hand, involving stacking the sheets in fork truck size loads required 32 hours.

Plywood, whether in carload or truck load lots is now received steel banded with special steel corner protectors to keep the bands from crushing the edges of the top and bottom sheets. Standard 4' x 8' plywood is banded in bundles approxi-

(Continued on page 90)

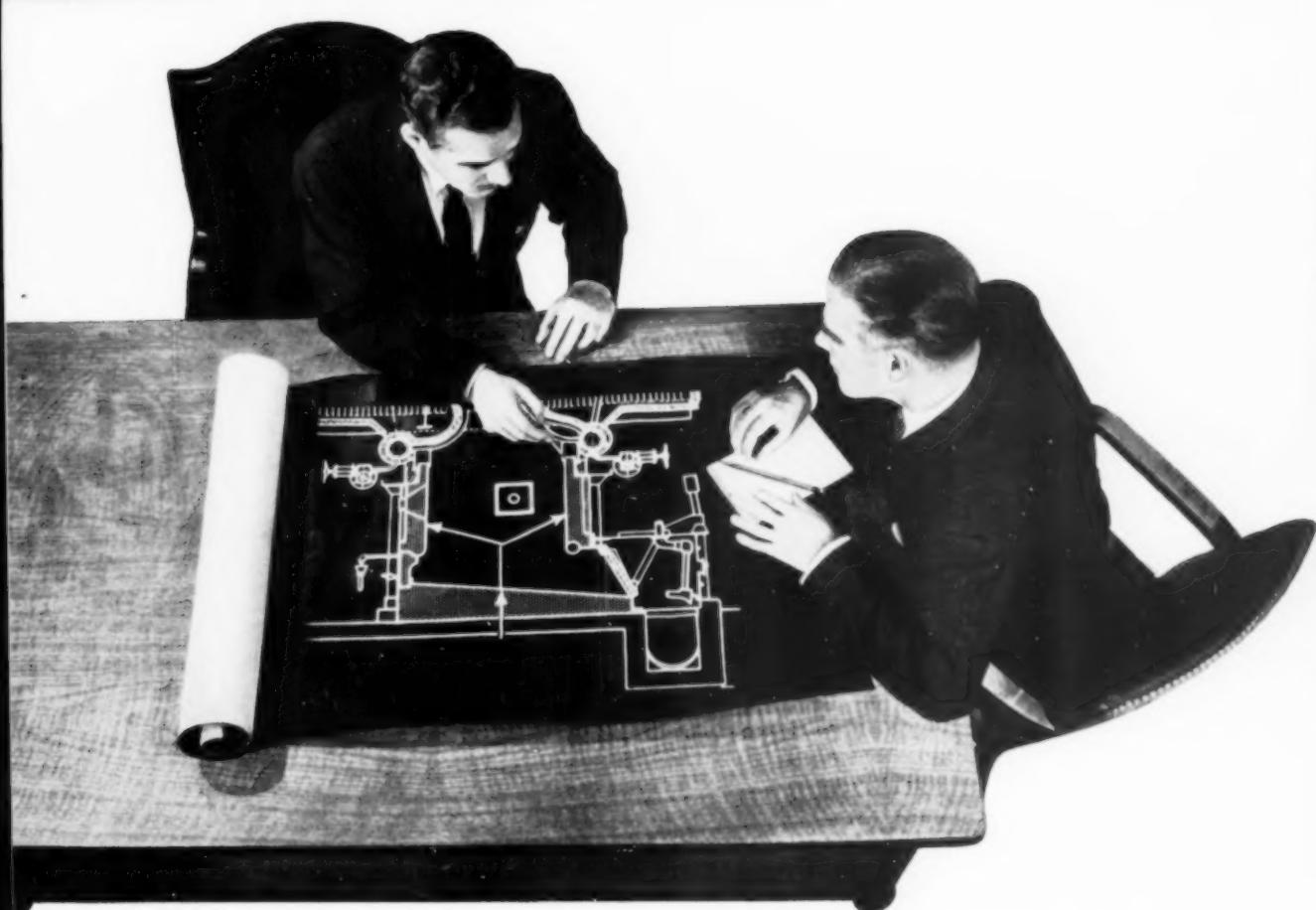


By F. C. CLAYTON

Chief Plant Engineer
Convair, Fort Worth, Texas

NEW METHOD for paper towel cartons consists of banding the cartons on disposable pallets at the shipping point. Upon receipt, they can be removed from the car and stacked in the warehouse in a single fork lift truck operation. Comparative costs of old and new method are noted.

UNLOADING by hand, involving stacking sheets of plywood in fork truck size loads, required 32 hours. With palletization, carload can be unloaded in 2 hours by a single fork lift truck and operator. Photo at the left shows steel banded lots in warehouse after removal from car.



PROMINENT PUBLIC UTILITY

Cuts ashpit maintenance with B&W Refractory Concretes

A trial installation of B&W Refractory Castable "A", a 2600 degree refractory concrete, was made in one boiler ashpit. To date this castable has given 25 months more maintenance-free service than the refractories previously used.

Results of this first trial were so encouraging that another ashpit, shown in the drawing above, was lined with B&W Refractory Castable "A". In this installation the two opposing high velocity water sprays cut refractories life two ways. First, water splattered on the hot walls (about 1800F) caused spalling. Second, the high velocity water jets had an abra-

sive effect on the floor refractories.

Here's the report: "After 20½ months service, B&W's Castable "A" lining was still in excellent condition—far superior to the refractories used before."

On the basis of these trials three other boiler ashpits have been lined with this 2600 degree castable.

In addition to ashpit linings, B&W Refractory Castable "A" is widely used in boilers for baffles, hearths, door linings, special shapes, repairing eroded brickwork and forming pier walls in stoker-fired boilers.

B&W Castable "A" is only one of

a line of B&W Refractory Concretes which cost-conscious boiler operators are putting to increasing use in many different applications. These B&W Concretes may help you cut installation costs and lengthen furnace life. Consult your B&W Field Engineer.

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 Chemical Recovery Units... Seamless & Welded Tubes... Pulverizers... Fuel Burning Equipment... Pressure Vessels... Alloy Castings

B470A

Employee Relations Difficulties

SP&I's Employee Opinion Survey—A Plant Engineer's Reaction

IN THE final analysis, every person working for a company from the highest to lowest paid does so for the same purpose. It is simply to obtain the highest pay and achieve the greatest accomplishments possible with his talents. Not a person alive would like to be told that his talents limit his possibility of promotion beyond the present job. Yet no one resents working under someone receiving higher pay if that person demonstrates daily his greater ability to hold down that job. If he shows by example how those below him can climb to his level if they will, true leadership exists. Daily performance of each person, particularly in management, demonstrating a prior claim to one's job because of ability, will result in healthy job attitudes all up and down the line. Happy workers have good opinions of almost all phases of their company if such is truly justified.

Off-the-Job Opinion

Beyond the employee opinion on-the-job, how does he feel the other 16 hours each day as a citizen? What is the community rating of his plant? How does the company look to him from his home? This is a vital factor, for an employee's opinions are the frequent topic of conversation with his friends.

Each company has in its team men and women chosen for their exceptional abilities in specialized fields. Are these abilities shared with the community in which they live, or are they devoted only to making higher income for the company?

Every large plant has equipment too expensive for smaller organizations — tractors, fire equipment,

"CONGRATULATIONS to Guy B. Arthur, Jr. and Southern Power & Industry for their Employee Opinion Report (SP&I for January, '54, pages 49-51). The frank directness of the questions makes the answers truly indicative of the employee's opinions.

It is my belief, purely as a regular reader of this magazine, that the Report suggests the very core of difficulty with Employee Relations and thereby opens up the avenue to better success.

In each case where the Report reveals a weakness in opinions, the fault seems to lie in the early training of the employee and subsequent communications between the employee and his company. May I make several suggestions to help relieve this situation?

ROBERT J. TUCKER, JR., Plant Engineer
Patterson Mills Company
Roanoke Rapids, N. C.

pumps, cranes, etc.—all with trained operators. Are their services quickly offered to the community or its people when the need arises? A sweating driver with his company owned tractor helping remove a record snow from his city streets is worth many, many public relations bulletins.

Plant services often speak louder of management's opinion of its employees than all the bulletins and booklets printed. What is the feeling of women as they enter a washroom? Are they as clean as home facilities? Do they blame the plant for letting such "personal" things slip? Lavish, expensive facilities are not necessary but certainly each washroom should be the very neatest and cleanest of its type. The example there is followed by the workers' treatment of their product.

This same example is necessary with rest rooms, cafeterias, smoking areas, and other facilities.

Accidents and product rejects go hand in hand with mentally secure, well informed workers. Rumors, sudden announcements of changes,

and startling news always lead to preoccupied minds with resulting accidents and waste. Are plant foremen continually informed of developments affecting their employees? When an announcement appears on the bulletin boards, are the foremen *previously* prepared to answer any questions? It is almost impossible to repair the damage of an incorrect impression or rumor carried home and spread through the community. Some workers are by nature ready to find anything easy to criticize. Is this taken in consideration in preparing bulletins and announcements?

"Why" is Often Lost

Why? That question pops up more often than it should. Right where decisions pass back and forth from the foreman's second hands or assistants to the workers the "why" seems to be lost. Frequently workers can make constructive suggestions that solve problems plaguing the foreman, if given the chance. Just as often decisions reach the workers with no explanation.

(Continued on page 90)

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MANUFACTURERS

**Modern drives in Louisiana
rice mill . .**

Flat Leather Belt Applications

APPLICATION NO. 1.—Photo shows a granulator for brewer's rice, located on the second floor of the building. The motor is mounted near the ceiling of the first floor on a tension control base (See Photo 2) and the belt passes up through the floor. A 220 volt, three phase, 1200 rpm, 25 hp induction motor is used. The distance between centers is 58" and the endless belt is double ply, oak tanned leather, 8" wide. The driving and driven pulleys are 14" and 22" in diameter respectively.

This drive has been in operation the entire past rice milling season and has never required specific attention. The temperature under which it runs ranges from about 40 F to very hot and humid conditions; but this has not caused any trouble. Superintendent P. L.

Louisiana Rice Growers, Inc., of Crowley, Louisiana, has recently installed new drives—practical and successful examples of flat leather belts under difficult conditions.

King says that this type of drive is particularly suitable for his mill because of its efficiency in transmitting power under adverse conditions without interruptions for maintenance.

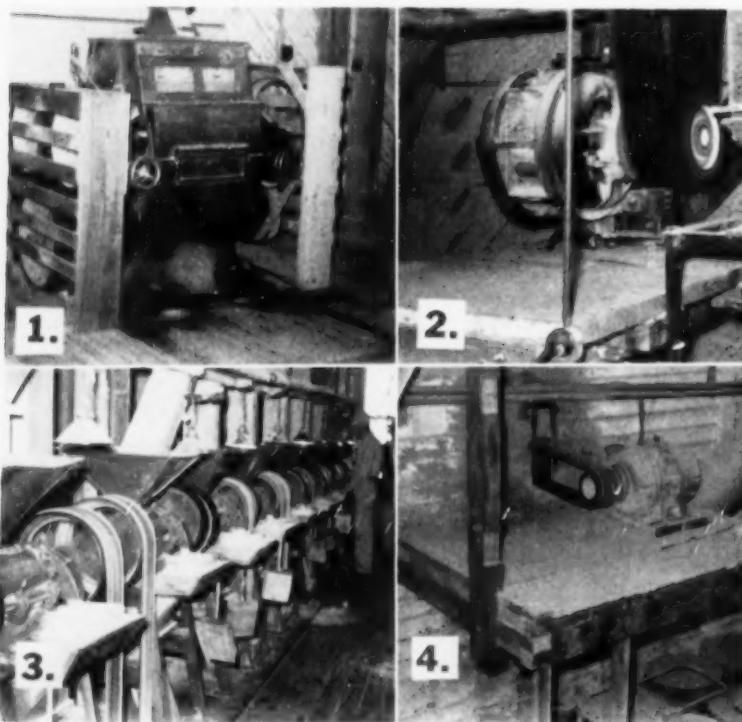
APPLICATION NO. 3.—Photo shows part of a row of rice hullers. The main lineshaft is steam engine driven and power is transmitted to each huller by an individual belt. The latter belts are double ply, oak tanned leather, 6" wide and endless. The driving and driven pulleys are 36" and

14" in diameter respectively, and the distance between centers is 108". In this case there is of course no tension control base as the belts run without undue slippage.

This type of drive is preferred by the superintendent because there are no hooks to break at the belt splices, and the flat leather belts have a high sustained overload capacity that often enables the hullers to pull through a load that might choke down other kinds of belts.

APPLICATION NO. 4.—Photo shows the drive for a dust collecting fan. This consists of a 15 hp, 1800 rpm, 220 volt, three phase induction motor mounted on a tension control base. The respective diameters of the driving and driven pulleys are 8" and 10", and the belt is also double ply, oak tanned leather, 6" wide, and endless. The atmosphere in which this drive operates varies from cold to very hot and dusty, but its performance is perfectly satisfactory under all conditions. It runs 24 hours per day and often 7 days per week.

This mill uses both electric power and modern group driven steam powered lineshafts. Electric power is used for isolated machinery not readily reached from the steam powered lineshafts, which carry the greater part of the load.



By **FRANCIS A. WESTBROOK**

Photos by Raymond Butler



No fatigue with 189 YARWAY GUN-PAKT EXPANSION JOINTS at this large Texas refinery

THEY just work and work for years and never get tired. Yarway Gun-Pakt slip-type joints simply will not fail through fatigue. They will operate smoothly, as frequently as required, over long, full traverse up to 12" single type or 24" double type or short, partial traverse, day in and day out—with never any danger of metal fatigue or failure.

This is just one of the many big advantages found in Yarway Gun-Pakt expansion joints. Other outstanding Gun-Pakt features are:

1. Can be serviced under *full* steam pressure day and night, thus avoiding costly and inconvenient shutdowns.
2. Fixed Gun-Pakt gland serves as "built in"

external guide and permits less costly and rigid pipe guidance than required by many other types of joints.

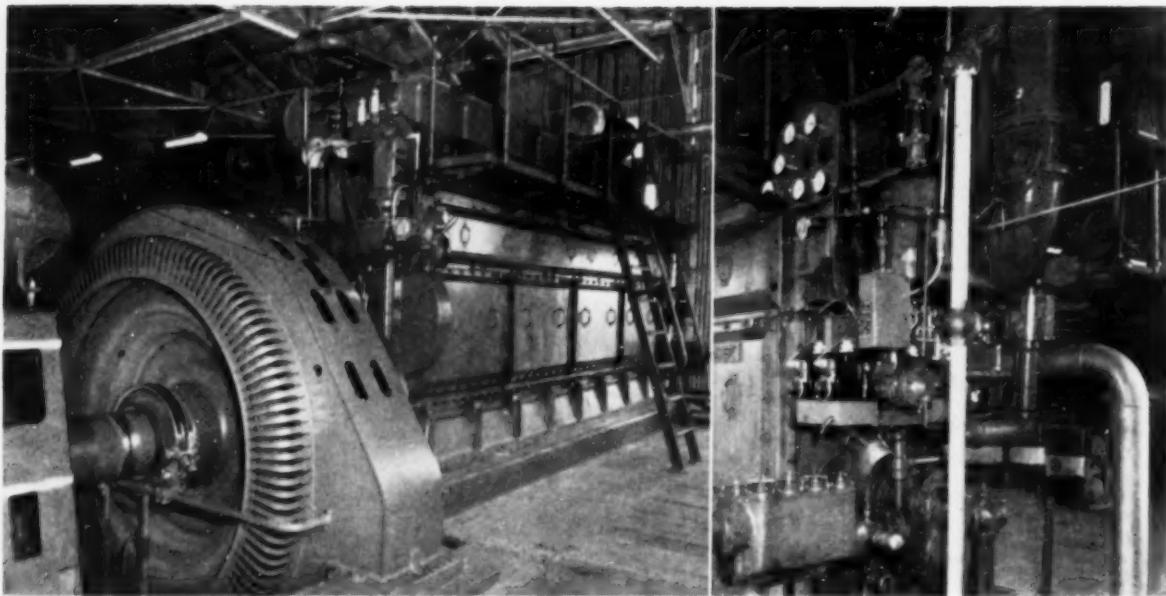
3. Lower pressure load on end anchors because excessive strains are eliminated.

Used for many years with success in well-known refineries, industrial plants, utilities and institutions. When replacing present joints or planning new steam lines, it will pay you to look into the advantages of the Yarway Gun-Pakt expansion joint. Write for Yarway Bulletin EJ-1913.

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YARWAY

gun-pakt expansion joints



NEWEST and largest of the prime movers is this Worthington high-compression natural gas engine, rated at 1,525 hp at the plant's 5,280 ft elevation. Photos also show Electric Machinery generator, Cuno lube filter, Alnor pyrometer, Marsh pressure gauges and Elliott turbocharger.

Natural Gas Engines Meet Power Demand For New Mexico Boom Town

RICH oil and natural gas fields were discovered close to Farmington, New Mexico. Prospectors with Geiger counters found uranium in the county. The prosperous town of 2,500 mushroomed to a city of 10,000 and the end was not in sight.

Such growth entailed serious problems in the provision of electric light and power. In 1945, the Town of Farmington had acquired the distribution system for an area with radius of 11 miles and generating facilities consisting of a small hydro plant and a 200 hp gas engine plant.

Additional prime movers were added quickly in 1946 and 47, and by 1949 the boom was under way. The city quickly constructed a new power house and installed two 250 hp units and one 932 hp unit. Officials watched the town and power load grow and recognized that they would have to progress to larger generating units.

The most recent engine is an

8 cylinder, 16 x 20 in., 360 rpm, Worthington natural gas unit rated at 1,525 hp at the plant's 5,280 ft elevation.

The new unit is producing a kilowatt-hour on a consumption of just 10 cu ft of natural gas. It is one of the first of its kind, a supercharged, high-compression, spark-ignition natural gas engine. It has a compression ratio of 12 to 1, equal to that of a diesel and attains the efficiency of the diesel. There are, of course, a number of important differences.

Operating Data

Gas requires a higher temperature than oil to initiate combustion, and spark ignition is utilized rather than heat of compression. No pilot oil is required as in the case of the dual-fuel diesel. In the average low-compression gas unit operating on the Otto cycle, the price for eliminating oil is higher gas consumption and lower thermal efficiency,

but the new high-compression engine cuts gas consumption sharply and still avoids use of relatively high priced oil.

At Farmington, where the gas supply is certain and abundant and the price is only 16 cents per MCF, the new engine's consumption of 10 cu ft per kwh means a total fuel cost of just 1.6 mills per kwh.

For proper operation, the spark-ignition engine requires an almost perfect mixture of gas and air. The Worthington achieves this through a governor-controlled air admission valve at each cylinder. Working in conjunction with the individual gas-metering valves, this system responds sensitively to changes in load and maintains the air-gas

(Continued on page 113)

EQUIPMENT SERVING WORTHINGTON ENGINE

Generator	Electric Machinery Co.
Governor	Woodward Governor Co.
Exhaust Turbocharger	Elliott Co.
Magnets	Bendix-Sentilla
Jacket Water Cooler	Young Radiator Co.
Jacket Water Pump	Worthington Corp.
Thermostatic Valve	Fulton Sylphon
Lube Oil Cooler	Sims
Lube Filters	Cuno Engineering & Mfg. Co., Hilliard Corp.
Cylinder Lubricators	McCord
Gas Pressure Regulator	Fisher Governor Co.
Gas Meter	American Meter Co.
Air Filter	Air Maze
Exhaust Silencer	Maxim Silencer Co.
Exhaust Pyrometer	Alnor, Illinois Testing Lab.
Switchgear	Westinghouse Electric & Mfg. Co.

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Palletized Purchases

(Starts on page 82)

mately 25" high and shipped 16 bundles to a carload. By stacking them in the car with 2 x 4 separators a complete car can be unloaded in two hours total time by a single fork lift truck and operator. Types of plywood handled by this method vary from $\frac{1}{8}$ " thick "teckwood" to standard commercial grade plywood in thicknesses of $\frac{1}{4}$ " to $\frac{3}{4}$ ".

Cartons Palletized

Paper towels were previously received in cardboard cartons stacked in a boxcar in bulk fashion. In unloading it was necessary to hand stack and bind the cartons on wood pallets which were then picked up and stacked in a warehouse by fork lift truck. The new method consists of banding the cartons on disposable pallets at the shipping point. Upon receipt these can be

removed from the car and stacked in the warehouse in a single fork lift truck operation.

The cost of banding, plus disposable pallets at shipping point is \$93 per carload. The previous cost for handling a carload of paper towels consisted of \$60.10 for materials (banding, top lagging, etc.) plus \$39.91 labor, and required 39 wood pallets which were reusable at some expense for repairs.

While the apparent saving is very small, the intangible savings are far greater. These include: reduced damage to product of 50%; speedier and more accurate inventory and issue; better utilization of warehouse cubage; elimination of empty pallet handling; and better and more efficient handling in distribution around plant.

As a result of the high degree of success in palletizing paper towels, other products are being studied with promise of additional extensive savings.

Employee Relations

(Starts on page 84)

tion of why it shall be so done. This leads to confusion and loss of respect for management, especially when the decision is wrong. After all the worker on the job usually knows more about that job than anyone else. Why not consult him when problems arise? It is an insult to his status as a free individual American not to offer the basic facts behind the decisions passed on to him.

Most of all it seems wrong to me to invite the people of any community to come and work in a plant if their welcome runs out with the first pay check. That's too much like the salesman who makes you feel like the best fellow on earth until you buy his product, after which you become just one more sucker who has done the same thing.

Engineering IS People

Comments by Mason Lockwood of Houston, Tex., before the Georgia Engineering Society start on page 67.

cause. There is already an alarming shortage of good engineering educators. Therefore such information had better not be released until our engineering education system catches up with the realities of life off the campus. And there is much evidence to indicate that it is catching up fast. Many of our better engineering schools are taking great strides in this direction. (Editor's Note: "Thank Providence for that, not the engineers.")

We engineers need to know, and especially our on-coming replacements need to know, much more indeed about getting along with people of all classes, types and cultures. To me, this means more of the humanities—more history, more psychology, more literature, more philosophy, and more culture.

What engineers should have is some kind of **composite course embracing all of the humanities** which they traditionally avoid but so desperately need in order to understand mankind. The course might well be called "Manamatics" so as to compete with mathematics in appeal to engineers.

And finally, let us consider the matter of self-expression. How can engineers hope for successful relationships with people **without a means of effective communication?** Of all our needs, ability to express our thoughts clearly and attractively is the most vital and the most neglected. Admittedly, my views on this are in part reflected dissatisfaction

over personal inadequacies of expression. You must agree, though, that (with other things being equal) engineers usually advance in approximate proportion to their expression abilities. An individual's oral expression may be superior and his written expression mediocre or limited. Sometimes the reverse is true. And, of course, some engineers excel in both oral and written expression. But usually, such ability is found only at the higher levels.

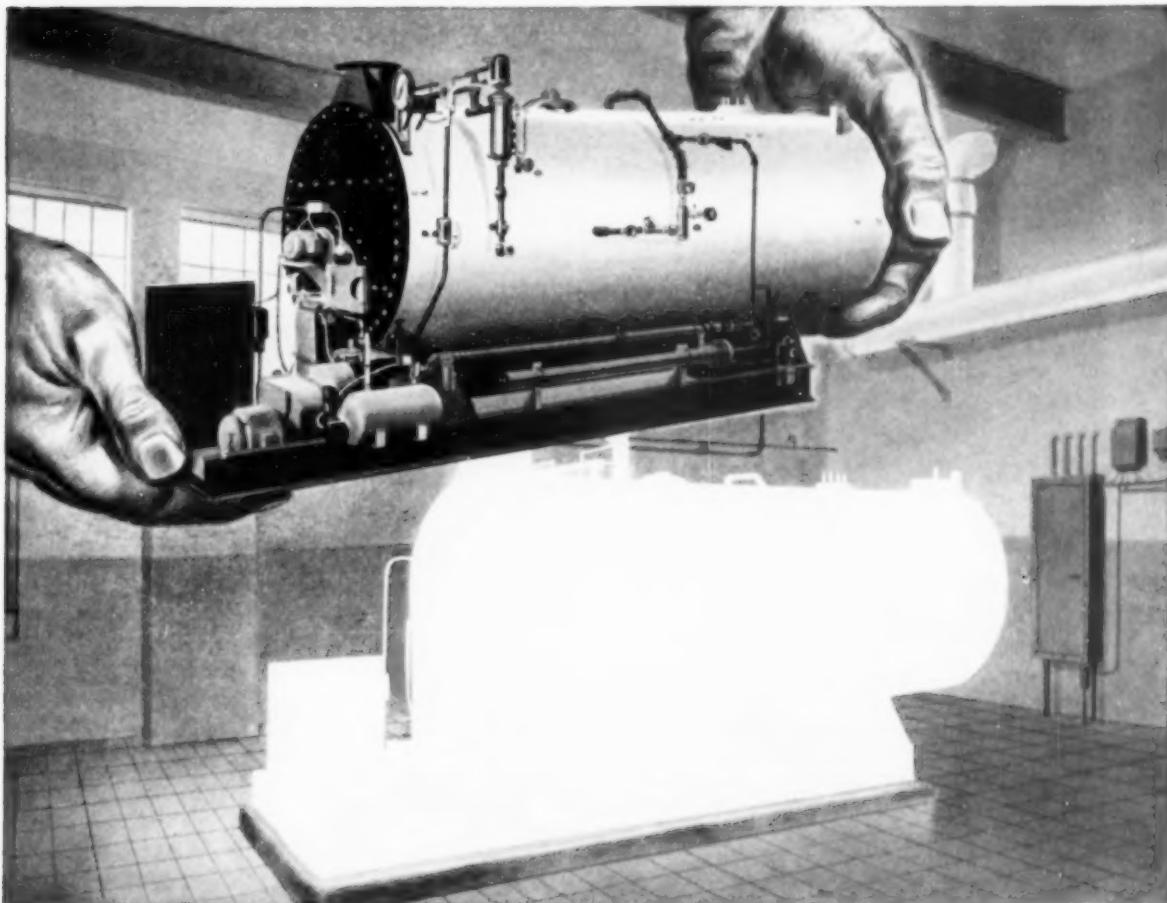
I challenge each of you, right now, to think of an engineer who has achieved or will achieve well balanced success without good powers of expression, oral, written, or both. In your own experience, what more quickly focuses favorable attention on a young engineer than an exceptional draft of a report, a letter, or a set of specifications? What more favorably marks an engineer than confident, lucid, pleasing oral expression?

Fundamentally these are natural endowments. But whatever our inherent abilities may be, any of us can improve remarkably. Intellectual laziness is the principal stumbling block.

Literature perhaps is the best home study aid, once we have finished formal schooling. Curiously, engineers know everything about assaying ores, but practically nothing about assaying essays.

Oliver Wendell Holmes called one of his classic essays "Cacoethes Scribendi." This "Latinish" term means the mania for writing or the itch for writing. What a wonderful thing it would be if this were a sort of seventy year itch and all engineers contacted it in early childhood.

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...only Cleaver-Brooks can offer you the experience gained from more than 20 years of pioneering . . . and more than 12,000 individual "packaged" boiler installations

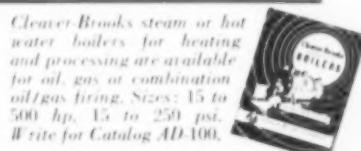
CLEAVER-BROOKS pioneering has been largely responsible for simplifying boiler buying . . . lowering costs of installation . . . delivering 80% guaranteed steam efficiency from every fuel dollar when firing with oil.

Boilers can be shipped as completely assembled and tested self-contained units, with auxiliaries as required. Installation involves minimum of time, construction and space. Usually connections only to steam, fuel, water lines and electrical service are needed. No special foundations are required. A short vent takes care of exhaust gases. Frequently, boilers are ready for use in a matter of hours, depend-

ing on availability of service lines.

Cleaver-Brooks, originators of the self-contained boiler, offers wider experience that counts in another important way. Qualified engineers help you plan steam plants tailored *exactly* for your needs. Carefully analyzed are loads, space and equipment arrangement. This not only helps you solve present steam needs, but adds flexibility for future expansion as well.

This application engineering, plus basically sound design and construction is your assurance of a full return from your boiler investment. When you specify a self-contained boiler—make sure it's a Cleaver-Brooks.



CLEAVER-BROOKS COMPANY
Dept. D-304 E. Keefe Ave.
Milwaukee 12, Wisconsin, U.S.A.





HELPING the MAN-IN-THE-PLANT

Ideas.. Methods.. Gadgets

How Powdered Metal Electrodes Offer Cost Reductions in Production Welding

Efficient use of arc heat by powdered metal coatings means: lower welding costs through higher welding speeds; lower cleaning costs because of less spatter and undercut; and smoother and more uniform welds.

HEAVILY coated electrodes containing large quantities of powdered metal in their coatings obtain increased welding speeds on the order of 50%, with appearance in smoothness and freedom from spatter almost equal to that obtained with automatic welding.

In general, as welding current increases, the speed of welding increases. The electric arc drawn from the end of a welding electrode performs the three functions of melting the core wire, melting the coating of the electrode, and melting the edges of the parts to be welded together. An increase in

welding current increases the speed with which the arc can perform these functions. For any given size electrode, welding speeds can be increased until a maximum usable current is reached. Beyond this maximum current a further increase causes difficulties which result in unsatisfactory operation. The difficulty may be an overheated electrode causing a breakdown of the coating, it may be too much penetration, gouging of the parent metal or too much spatter. In any case, the effect is to impose the top limit on welding speed.

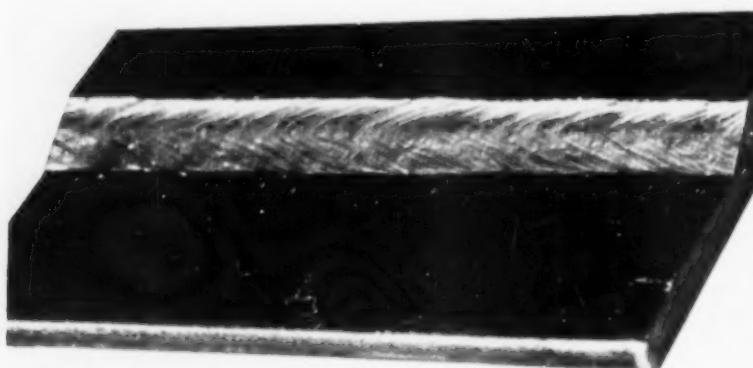
Electrodes with powdered metal

coatings are designed to raise this top limit on welding speeds by eliminating or reducing the effect of these difficulties.

Powdered Metal Electrodes Use Excess Heat Available

The major cause of operating difficulties that limit welding speeds is the fact that the welding arc normally creates more heat than can be effectively used by conventional electrodes in melting the parent metal, the core wire and the coating. This excess heat usually is expended in melting an excessive amount of parent metal. The arc force throws this excess and some of the melted core wire out of the molten pool. The result, depending on the application, may be too much penetration, gouging, undercutting and spatter. The correction for the difficulty with conventional electrodes is, of course, to cut back on the amount of current used and slow up welding speeds until satisfactory operation is obtained.

Electrodes with powdered metal coatings use the excess heat available in the arc to increase welding speeds. The powdered metal in the coating is melted by this heat and becomes an additional source of



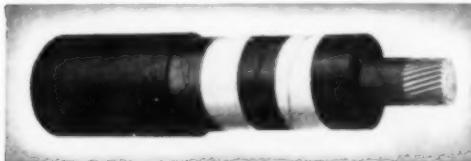
POWDERED METAL COATINGS produce smooth, clean welds, comparable to those produced with automatic welding. This is a horizontal lap weld made in $\frac{1}{4}$ " diameter electrode. Current is 360 amp, arc speed 18" per min. Conventional electrode, E-6012, calls for 320 amp current and 12" per min arc speed.

POWDERED IRON ELECTRODES were introduced commercially with Jetweld in late 1953 by The Lincoln Electric Co. This discussion has been adapted from comments by L. K. Stringham, Chief Engineer, The Lincoln Electric Company.



FLEXIBLE, LIGHT WEIGHT OKOLITE-OKOPRENE SIMPLIFIES INSTALLATION

Flexibility and light weight simplified installation of these 15-kv Okolite-Okoprene feeder cables in ducts at a large industrial plant in southern New Jersey. These cables feed a unit



substation through extensive duct systems from the switch tower. The crew pulled runs as long as 340 feet without mechanical assistance, using as the pulling lubricant only soap flakes and water.

Easier handling and splices are made possible by the light weight, non-metallic Okoprene sheath used in Okolite-Okoprene cables. Okoprene, a tough, abrasion-resistant neoprene compound, has proved its durability in every operating condition. It is not affected by moisture, heat, ozone, acids, weather extremes or most oils. Operation at continuous high or low temperatures will not damage Okoprene.

Full information on installation procedures, splices and terminations is included in Bulletin S P-1075, the complete 128-page manual on rubber-insulated, high-voltage power cables. Write for your copy to The Okonite Company, Passaic, N. J.



OKONITE SINCE 1876 *insulated cables*

2207

Helping the man in the plant (continued)

metal for the weld, thus permitting an increase in welding speeds. The difficulties of excess current, spatter, gouging, undercutting, are minimized and additional metal is available to make full welds at the higher speeds.

If an electrode contains sufficient iron powder in the coating to supply one third of the deposited metal from the coating and two thirds from the core wire, that electrode can deposit metal 50% faster than the same size electrode without iron powder in the coating. Proper balance is necessary between coating and core wire, for if too much iron powder is put into the coating, so

much of the heat of the arc may be absorbed by melting the coating that there will not be enough to melt the parent metal and core wire.

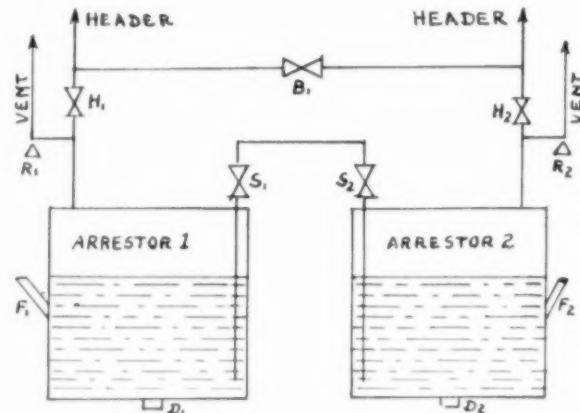
Limit to Welding Speed

In addition to reducing spatter, undercutting and gouging, this more efficient use of arc heat by powdered metal coatings also reduces overheating in electrodes. Overheating is an operating difficulty frequently encountered on welding applications where the rate of metal deposition is the only controlling factor on welding speeds. The temptation is to push welding current up to its maximum since

current controls the rate of metal deposition. The danger is that of overheating the electrode to a red hot condition by forcing it to carry more current than its size warrants. A red hot core wire will break down the electrode coating so that it cannot satisfactorily perform its functions. The limit to welding speed, therefore, becomes the maximum current which can be used without producing a red hot core wire.

Powdered metal electrodes effectively raise the limit on welding speeds imposed by the current carrying capacity of the core wire. More metal is available for deposition and the more efficient use of the arc heat permits increasing welding speeds without necessarily increasing currents.

1. Open by-pass valve B so as to connect both service headers together.
2. Close supply valve S_1 and header valve H_1 so as to isolate arrestor 1 and leave arrestor 2 connected to both service headers.
3. Bleed all pressure from arrestor 1 by manually operating relief valve R_1 . Never bleed pressure through filling connection F_1 or drain plug D_1 .
4. Open fill connections F_1 and drain D_1 , draining all liquid from the vessel. Replace the drain plug and refill with water through F_1 until the water overflows at F_1 . Use a 1:1 glycerine-water mixture in outdoor arrestors to prevent freezing.
5. Close filling connection F_1 .
6. Purge arrestor of air by opening supply valve S_1 and manually cracking relief valve R_1 for fifteen seconds.
7. Making certain that R_1 is closed, open header valve H_1 so as to place arrestor 1 back in service.
8. Repeat the entire procedure with arrestor 2.
9. Close by-pass valve B when both arrestors have been serviced and all other valves have been returned to their original positions.



Flash Arrestors for Shop Acetylene Lines

WHERE a series of installations are needed in larger shops to provide service for oxyacetylene welding and cutting, the manifold system supplying the acetylene gas must be protected with flash arrestors. Most city building codes require them, or the insurance underwriters request their installation. Their purpose is to prevent flame from passing beyond a designated point—a safe distance from the manifold tanks and regulators. These arrestors must be properly installed and serviced if the build-

ing cascade system is to function properly.

The main objective of the servicing is to replace the water to the proper level, meanwhile making certain that the system is without leaks. Here are a few general points: When the venting is done, make sure the area near the vent opening is free of open flames or other possible sources of ignition. Never attempt to blow the water out of an arrestor with acetylene. Finally, when putting the arrestor back into service, soap all the plug

connections to check for leaks.

Twin Arrestors—If only a single arrestor has been provided it is necessary to shut down all welding stations served by the arrestor while servicing. If a twin installation is used, then one can continue in service while the other is down.

Single Arrestor—When there is only a single arrestor the procedure is the same, except that the welding operations served must be first shut down. Then close the inlet and outlet valves, vent and drain the arrestor refill and purge it, and place back in service as with the individual arrestors in the twin installation.

By Paul C. Ziemke
Oak Ridge, Tenn.

SARCO
Thermodynamic
STEAM TRAP



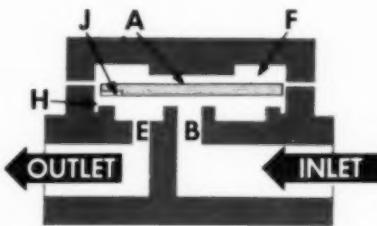
ACTUAL SIZE

this new trap virtually eliminates maintenance - won't wear out

**SOLID STAINLESS STEEL DISC
ACTS AS VALVE HEAD**



HERE'S HOW IT WORKS!



Air and/or condensate raise valve seat disc A, discharge thru E. When steam follows, greater velocity causes it to strike body at H thus building up pressure in chamber F. This causes disc to seat, closing tube B. As pressure in F decreases by condensation and leakage thru slot J, pressure in tube B raises disc and cycle is repeated.

The Sarco Thermodynamic Trap has proved successful on steam mains and separators; headers and soot blower pipes; engine and turbine stop valves, separators and casing drains; alternate heating and cooling applications.

A solid stainless steel disc—practically indestructible—is the only moving part!

Most striking feature of the Sarco Thermodynamic Trap is its simple maintenance-free design. There's only one moving part—a solid stainless steel disc that practically lasts forever. There are no other moving parts to wear out or cause trouble.

Condensate, air and steam act directly on the disc valve which opens to discharge condensate and air—snaps shut to contain steam. There are no mechanical devices required to operate valve (see diagram at left). That means practically endless trouble-free operation.

Other advantages: small size, easy installation, not affected by shock or vibration, immunity to corrosive elements with all wearing parts stainless steel, same valve head and seat for all pressures to 600 psi and temperatures to 950° F.

Check these advantages to your own satisfaction at absolutely no cost. We'll send you a trap for free trial. All you do is fill out the coupon and mail it in.

SARCO COMPANY, Inc.

Empire State Building, New York 1, N.Y.

**MAIL COUPON
TODAY FOR
FREE TRIAL**

Sarco Company, Inc., Empire State Bldg., New York 1, N.Y.
Gentlemen: Please send me a Sarco Thermodynamic Trap for 30-day trial, requirements as checked.
Size: $\frac{1}{2}$ "... $\frac{3}{4}$ "... 1".... Operating Pressure:psi

For installation on.....

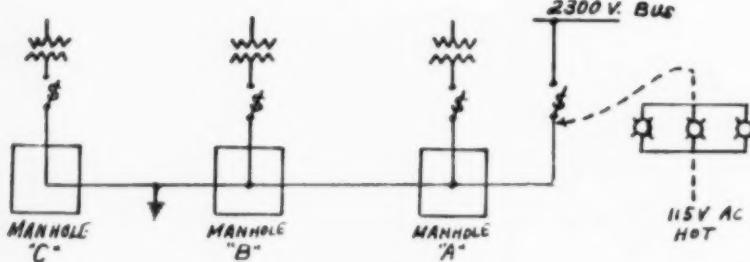
NAME.....

FIRM.....

ADDRESS.....

CITY..... STATE.....

Helping the man in the plant (continued)



Locating Ground in a Feeder System

THE underground feeder system in an industrial plant is a vital link in a manufacturing process, which requires little attention after installation. Although an auxiliary feeder may be available, a fault appearing on a feeder must be located and corrected as quickly as possible to avoid an excessive process outage.

A ground fault in either rubber insulated or lead cable can be quickly and positively located without special instruments. By passing an alternating current through the affected cable to ground, this current may be traced from manhole to manhole until the ground is isolated.

Case Study

An example of how this works is shown in the illustration. A bank of lamps was connected in series with a 115 volt lighting circuit hot lead, through the affected cable to ground, returning to the grounded 115 volt neutral. The number of lamps used will depend on the resistance of the ground fault in each case. It is desirable to obtain a current of from 2.5 to 5 amperes, which will give a positive reading on a clip-on type of ammeter.

The ammeter was placed on the cable where it enters manhole "A" and since current was present, the two cable "exits" were checked. In this manner, the current was followed to the cable leaving manhole "B." It did not enter manhole "C." This was a positive indica-

tion that the fault was in the duct line between the two manholes. The total time required to locate this fault, after the manholes were pumped out, was 30 minutes.

Many times a ground fault will be found in a splice or a transformer pothead, where its correction is simply a matter of reworking the splice or pothead. The method described is especially suited to this type of fault, since the greater insulation thickness at these points usually leaves a higher resistance ground.

Locating a ground fault without disturbing the cable saves both time and material in restoring the cable to service.

By R. L. Gouckenour, Mathieson Chemical Corp., Lake Charles, La.

\$\$\$ For Your Ideas

Send your ideas, methods and short-cuts to Southern Power & Industry. Payment is made for suitable material—a photo or rough sketch will make your idea more valuable.

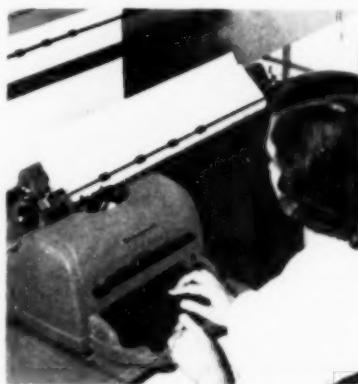
Articles from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

Southern Power & Industry
806 Peachtree St., N.E.
Atlanta 5, Georgia

Lone Star Improves Office Procedures

THE executives of Lone Star Steel, aware of the competitive nature of their business, are taking full advantage of modern methods in the office as well as in the plant.

Many of the statistical and financial reports produced must be prepared on long forms ranging up to 24 or 25 in. in length. A 27 in. typewriter carriage is necessarily heavy, and on the manually-operated machine the typist tired quickly from the repeated carriage returns required in the preparation of a single report.



When Remington Rand introduced the 10-Key Decimal Tabulator Electri-economy Typewriter, Lone Star installed this machine with a 27 in. carriage for such work. These reports usually run to several pages, but since the only effort required to return the heavy carriage is the touch of a key.

Furthermore, the operator can produce as many as 14 clear carbon copies with no more effort than would be required for typing a single copy. Electric power can be adjusted so that each key strikes the paper with exactly the same force, so that there is no chance for the carbon copies to appear uneven.

In bookkeeping operations Remington Rand 10-key electric adding machines also contribute to accuracy and speed. Because of the touch system which is possible on the 10-key board, operators can run a column of figures accurately without needless side-to-side head motions.

USE

MonoRAIL CRANES



- ... Where Space is Limited
- ... To Handle Variable Jobs
- ... For Low Maintenance Cost



These are just a few reasons why American MonoRail Cranes are gaining in popularity and are being installed in increasing numbers of plants the country over. Call in your American MonoRail representative and have him tell you all the advantages of MonoRail Cranes such as—ease of handling—smooth travel—strength—safety interlocks—power operation and **interlocking carrier service between and beyond the craneways**. Consultation in connection with any handling problem is available without obligation.

Send for your copy
of C-1 Bulletin



AMERICAN **MonoRAIL** COMPANY
13105 ATHENS AVENUE • CLEVELAND 7, OHIO

Helping the man in the plant (continued)

Crane Operating Costs Reduced—Mississippi

HOW a single, comparatively small Diesel engine reduced operating costs and increased the daily work output of a 40-ton locomotive crane formerly powered by two steam engines is a Diesel efficiency story attested to by American Creosote Works, Inc., of Louisville, Mississippi.

M. C. Miller, company manager, reports that even though the crane formerly required separate engines on the swing and hoist, the single Diesel now powers both satisfactorily and has speeded up the crane's operation by 20%. The new power has also reduced operating costs by 50%.

Problems arising from the crane's original two-engine design were worked out by engineers of



the Lewis-Diesel Engine Company of Memphis through the use of a General Motors six-cylinder Series 71 Diesel. Design features of this

engine made the two sources of power needed for the installation readily available.

The company uses the unit to stockpile railroad ties and other products in its extensive wood-preserving operations.

\$\$\$ For Your Ideas

Send your ideas, methods and short-cuts to Southern Power & Industry. Payment is made for suitable material—a photo or rough sketch will make your idea more valuable.

Articles from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

Southern Power & Industry
806 Peachtree St., N.E.
Atlanta 5, Georgia

Reclaiming Method For Drill Collars

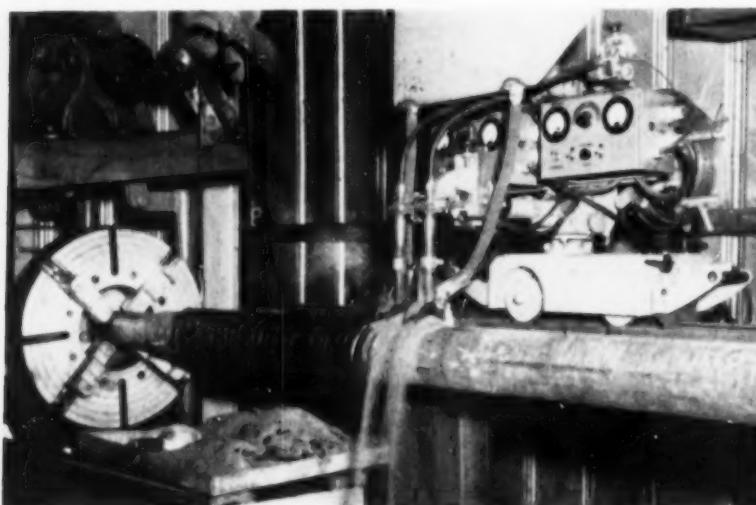
A DUAL Unionmelt welding machine is now used at C&W Machine Works, Great Bend, Kansas, to reclaim drill collars in about one-half the time formerly required. The added speed has doubled the capacity of the instal-

lation and has made it unnecessary to purchase another jig or provide added space.

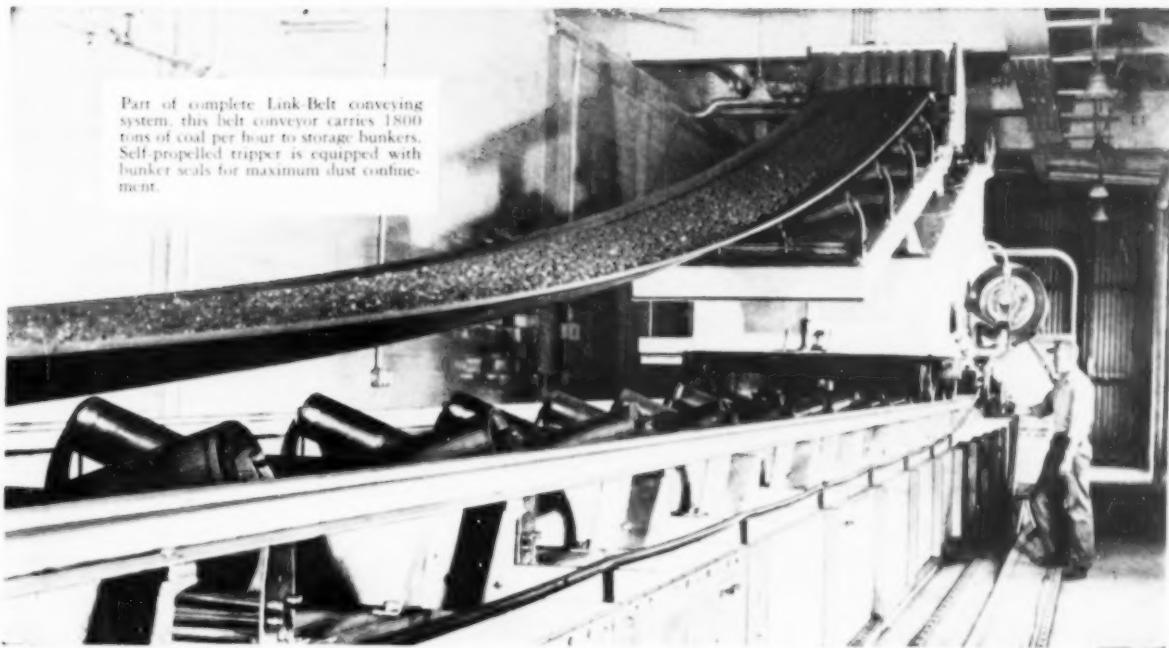
Two Unionmelt (Linde Air Products Co.) Type D welding heads mounted on a single carriage deposit a layer of metal on small-diameter cylindrical pieces, using submerged melt welding with the multiple-head technique. The dis-

tance between the two electrodes is adjusted so that after one revolution, the bead from the second electrode is laid down beside that from the first, as shown in the photograph. One complete layer of metal is deposited on the collar by making three passes with the machine.

The main advantage of the installation is increased welding speed. Using two heads gets the job done twice as fast. Also, with this spacing of the electrodes, there is no overheating of the metal. The composition does not stick to the collar as it might if higher current and a single electrode were used, and there is little problem of controlling the molten metal.



Double Unionmelt D Head cuts welding time 50% for surfacing drill-pipe collar. Welding conditions are rather critical for a smooth job. The collars are rotated one revolution per minute and the speed of travel is 2% in. per minute. These values are chosen so that the total number of beads will just fit the circumference of the collar. Welding current applied to each head is 350 amp at 28 to 30 volts. Unionmelt composition Grade 80 is used with Oxweld No. 296 wire which gives a tough deposit that is somewhat work-hardening.



Part of complete Link-Belt conveying system, this belt conveyor carries 1800 tons of coal per hour to storage bunkers. Self-propelled tripper is equipped with bunker seals for maximum dust confinement.

SURE ROAD TO LOWER HANDLING COSTS

...carry the load via Link-Belt belt conveyors

LINK-BELT offers you
the "total engineering"
so necessary for top efficiency



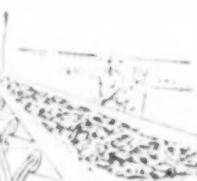
**DESIGNED FOR OVERALL
EFFICIENCY**—Because of its unrivaled experience, Link-Belt can do a better job of gathering and analyzing all data. Proposals reflect this understanding of the most practical way to fit individual conveyors into your overall system requirements for best results.

BUILT FOR LONG-LIFE PERFORMANCE—Link-Belt manufactures all components and related feeders and conveyors. You are assured of the right equipment because of this breadth of line. And Link-Belt will supply the highest grade belts engineered to the specific job.



DELIVERS FULL RATED CAPACITY

Link-Belt follows through on every detail of the job, including electrical controls and even wiring and foundations. What's more, Link-Belt will furnish experienced erection superintendents, staffs and skilled crews at the customer's request.



**ASSURES SATISFACTORY
PERFORMANCE**—When you rely on Link-Belt as a single source for your complete system, we accept responsibility for placing it in full operating readiness. We will also supervise modernization of existing systems. For all the facts call your nearby Link-Belt sales representative.

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BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY, Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarborough (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. 11-466-8

Helping the man-in-the-plant (continued)

Faster Truck Loading

NO TRUCK loading dock is ever exactly the right height for all vehicles. For one thing, the ground-to-bed measurements of standard motor equipment vary as much as 12 in. For another, as heavy material is put aboard or removed, spring compression or expansion changes the bed levels.

The time losses and difficulties caused by these variables have been done away with in Tube Turns' plant at Louisville, Ky., where modern loading docks have been constructed. They incorporate hydraulically activated bridges that take care of varying truck heights and the progressive changes that occur when Tube-Turn fittings and flanges are being loaded.



Leva-Dock (Rotary Lift Co.) installation at the Tube Turns' plant in Louisville, Ky.

In operation, the new bridge—called a Leva-Dock—is raised by the hydraulic jack to a position

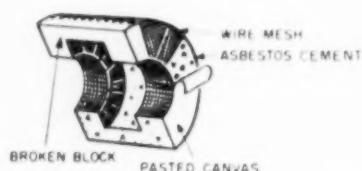
Removable Insulation Simplifies Maintenance

IN PLANTS where pipe lines are rearranged now and then, or where for any reason frequent maintenance of flange fittings is required, it is advisable to apply thermal insulation in such a way that it may be easily removed and replaced.

Both sectional and block forms of 85% Magnesia are suitable for this type of application. The thickness of the insulation should be the same as that of the adjacent pipe insulation, and it should be long enough to overlap the pipe insulation on either side of the fitting by at least 2 in. The pipe insulation itself is generally

beveled off to permit ready access to flange bolts after the flange insulation has been taken off.

Data courtesy of The Magnesia Insulation Manufacturers Association.



If 85% Magnesia in block form is used, two halves of a galvanized wire mesh frame are prepared which will fit the flange and can serve as a base to which the block insulation may be applied. Wire mesh is then stretched over the outside of the blocks as well, and all surfaces of both halves are finished with a layer of asbestos insulating cement.



The two halves of the removable flange insulation may either be secured with perforated strap iron, loops of wire, or stapling wire may be used. The space between the od of the pipe insulation and the id of the flange insulation is filled, if necessary, with sectional insulation of an intermediate size.

When sectional insulation is used, each half-section is wrapped inside and outside with galvanized wire mesh, and covered with a thin layer of asbestos insulating cement.

higher than the level of the truck bed. When the truck is properly positioned, supporting arms are lowered and the platform comes to rest upon them. As the loads are rolled into or out of the truck, the bridge follows the bed as it settles or rises. Its rated capacity is 20,000 lb.

Time studies show that each of the new bridges has cut loading time an hour or more per day. And the elimination of the movable steel plates formerly used as bridges has reduced maintenance costs of in-plant power vehicles and other freight handling equipment.

Removing Vapors Prior To Welding

WELDING on tanks which have contained volatile substances, must be done under controlled conditions. In fact even soldering operations have proven disastrous when vapors ignited with considerable force. Steaming such containers has proven reasonably effective when performed with caution. However, steam is rarely at hand when needed, hence other techniques have been tried.

One man solved the problem by pouring 3 lb of crushed dry ice into a 50 gal tank after emptying it of its liquid petroleum contents. The "ice" (Carbon Dioxide) is permitted to remain in the tank for 15 min before welding is begun. During this time the ice is converted to CO₂ gas which expels all the oxygen and by the same token freezes any latent liquids imbedded in the seams or crevices. It is these "hard to get at places" that did not always get sterilized by the old steam method. With the air excluded by CO₂ vapor pressure and all the volatile vapors condensed it is possible to begin welding or soldering work with full assurance of safety.

Once the repairs are completed the tank can be refilled at once, since even if a small quantity of ice remains in the tank, it will vaporize harmlessly throughout the tank contents.

By Paul Ziemke, Oak Ridge, Tenn.

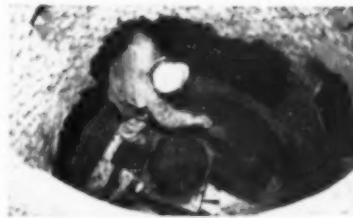
**Johns-Manville Insulations
save industry a billion dollars in fuel every year!**



**Reduce your fuel costs and build better furnace linings
with JM-3000 INSULATING FIRE BRICK**

HERE'S THE ONLY insulating fire brick that withstands a full 3000F. It's highly efficient both as an exposed refractory lining or as back-up insulation. And JM-3000 is only one of six types of Johns-Manville Insulating Fire Brick made for these applications. All provide long-life insulation. All are light in weight, have low conductivity, high structural strength. These properties permit thinner furnace walls—yet you can achieve important fuel savings and increased production, because J-M Insulating Fire Brick assures quick furnace response.

Sil-O-Cel® Insulating Brick is another outstanding J-M fuel-saver . . . a high load-bearing brick for back-up insulation behind refractory linings. It comes in three types, for service through 2500F—makes it possible to reduce the necessary thickness of refractory linings as much as one-third.



Save fuel with
J-M Hydraulic Setting Refractories

Johns-Manville refractories meet every need for castable, troweling and gunning applications for temperatures through 3000F. *Firecrete*[®] is used to cast special shapes of all kinds. It is ready for use within 24 hours, has negligible shrinkage and high resistance to spalling. *Blazcrete*[®] is used to build and repair furnace linings. When gunned, it adheres readily with a minimum of rebound loss. When slab-troweled, it eliminates laborious ramming and tamping.



Save Fuel with J-M Aggregates and Fills

These lightweight insulations are used as fills to conserve heat in irregular spaces where other forms of insulations cannot be economically applied. They are also used as aggregates for mixing with other materials to form insulating refractory concrete.

Reg. U. S. Pat. Off.

Send for your free copy! This new booklet IN-115A gives full details about J-M insulating materials for service through 3000F. To find out how they can help cut your fuel costs, simply mail coupon.



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(In Canada, 199 Bay St., Toronto 1, Ont.)
Please send me, without charge,
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**Johns-Manville
FIRST IN INSULATION**

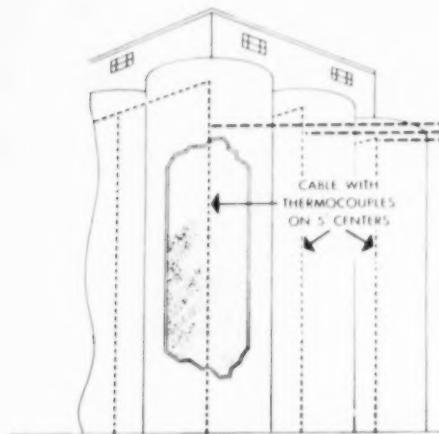
Equipment..Supplies..Methods

Packaged Automatic Boiler

D-1 ORR & SEMBOWER, INC., READING, PA., has announced the extension of its Model 4 line of packaged automatic boilers through 100 hp size.

The line is being constructed for light oil firing, for gas firing, and for combination gas or oil firing.

The "POWERMASTER" is a 3-pass boiler with a single flue gas flow reversal at either end. A minimum of 5 sq ft of heating surface is provided per bhp. Three-pass design provides maximum convenience for inspection and cleaning. Forced draft eliminates the need for a stack. All programming and safety controls are completely automatic.



Cables from several storage bins lead to recording instruments at a central reading point. At any given time it is possible to know exactly what the grain temperature is at any location in any storage bin. System also applicable to temperature checking of stored hydrocarbons, such as coal and petroleum.

Temperature Checking Cable

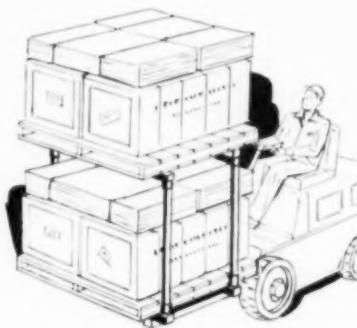
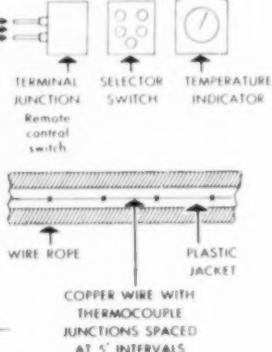
D-2 PTC CABLE COMPANY, Pioneer Bldg., St. Paul, Minn., has marketed a temperature checking cable designed to detect deterioration in stored grains. Other industrial applications include temperature checks on stored hydrocarbons, such as coal and petroleum.

The cable (plastic-coated copper circuit, with constantan thermocouples every five feet inside a wire rope) is being manufactured for PTC Cable Company by Jones & Laughlin Steel

Portable Pallet Rack

D-3 THE PALTIER CORP., 1701 Kentucky Street, Michigan City, Indiana, announces a new method of expediting incoming-outgoing inventory.

As much as from $33\frac{1}{3}\%$ to 50% increased space utility can be added, by means of the Palteam Portable Pallet Rack, which can be used to



Rack has slip-fitting posts—bottom pallet can be set in or removed from the rack, or the rack and pallet can be picked up and moved as a unit.

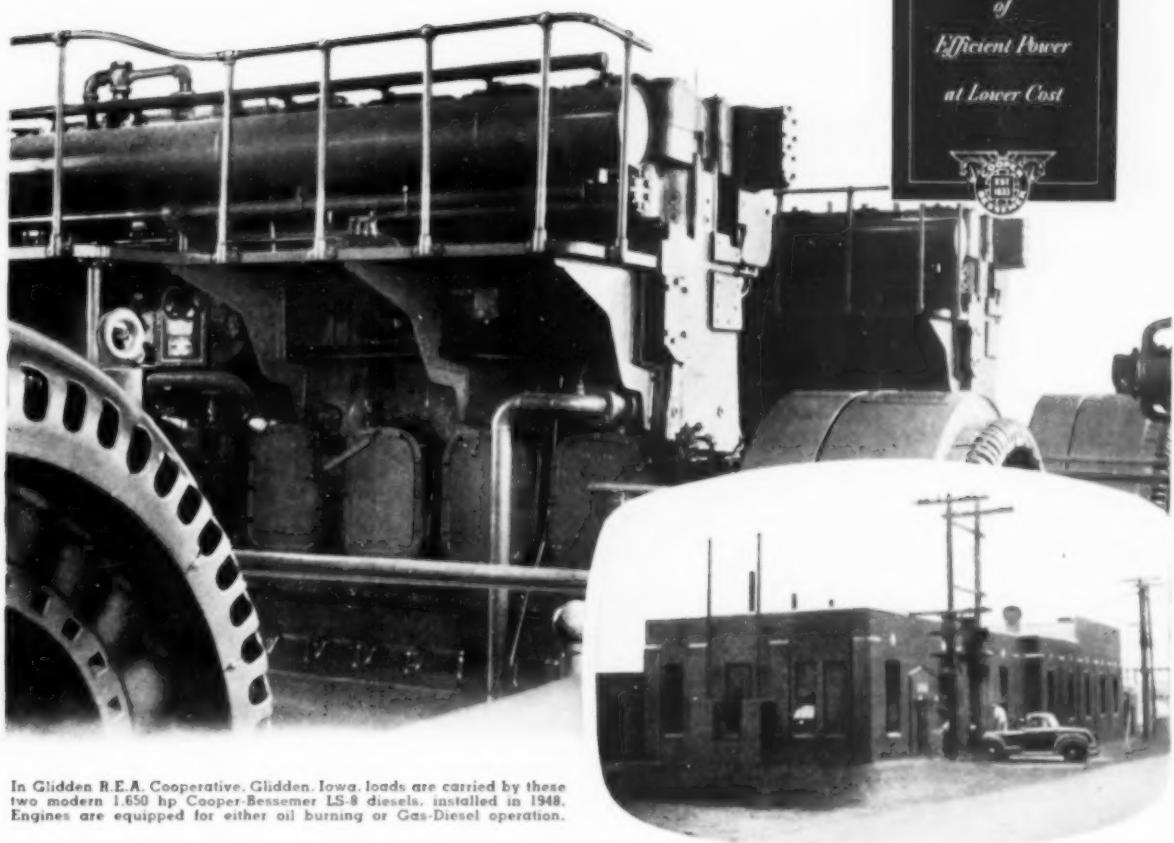
take care of overflow inventory, and permits block storage, which is impossible with one deep permanent pallet rack. It can be used where material is being processed to provide stacking of two pallets instead of one.

Skid-Proof Surface Coating for Floors

D-4 PENNSYLVANIA SALT MFG. Co., Philadelphia 7, Pa., has developed "NeoFloor" skid-proof surface coating for concrete, wood and metal floors in plants, shops and other places where oils, greases and chemicals create safety hazards and maintenance problems.

NeoFloor is a grit-like material anchored in a matrix of resilient neoprene and bonded firmly to the floor with an adhesive primer. Both primer and coating are supplied in liquid form for easy, quick-drying application with brush or roller.

It is highly resistant to fumes, spillage from acids, alkalies, salt solutions and solvents at temperatures up to 220 F. Also waterproof, this coating is impervious to oils and greases and is easily cleaned with commercial detergents and cleaners.



In Glidden R.E.A. Cooperative, Glidden, Iowa, loads are carried by these two modern 1,650 hp Cooper-Bessemer LS-8 diesels, installed in 1948. Engines are equipped for either oil burning or Gas-Diesel operation.

*Another Example
of
Efficient Power
at Lower Cost*



How Glidden Can Make The Most of Oil OR Gas

The Glidden R.E.A. Cooperative, Glidden, Iowa, is an efficient, progressive organization—not only in building line loads, extending distribution and giving exceptional customer service, but also in taking advantage of the latest developments in equipment and power.

For example, they made no mistake when they added the two 1,650 hp Cooper-Bessemer LS-8 diesels shown above. Because of their size and efficiency, these modern engines now carry the plant's base loads, while six smaller, older diesels serve as fill-ins as load demands dictate. Now op-

erating as oil-burning diesels, averaging about 14.3 kwh per gallon of fuel, the LS's are already fully equipped for even more economical Gas-Diesel operating, just as soon as gas becomes available.

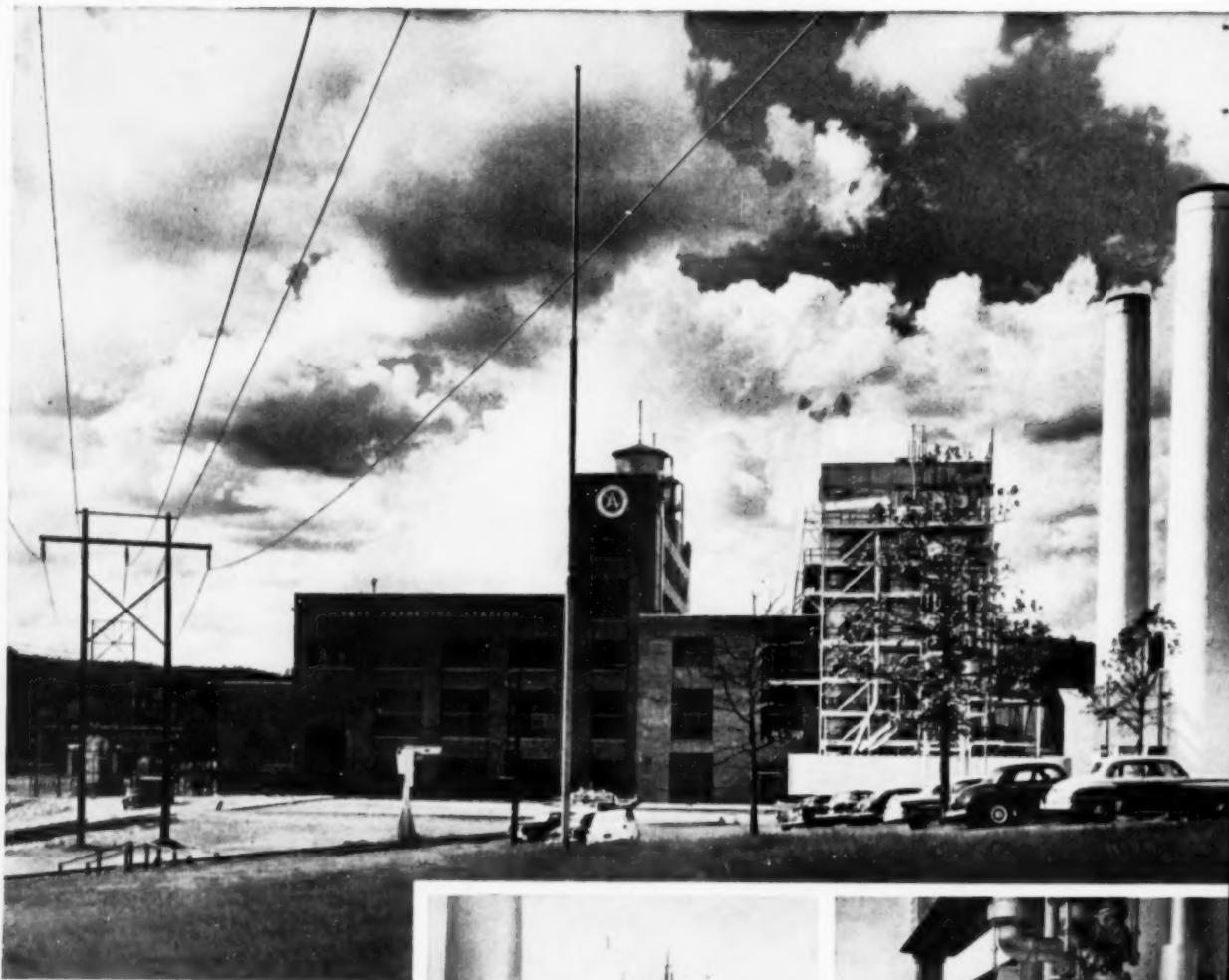
Whatever your power needs call for—gas engines, diesels, Gas-Diesels—Cooper-Bessemers offer you the most advanced, money-saving features. Be sure to check up.

The
Cooper-Bessemer
Corporation

MOUNT VERNON, OHIO — GROVE CITY, PENNA.

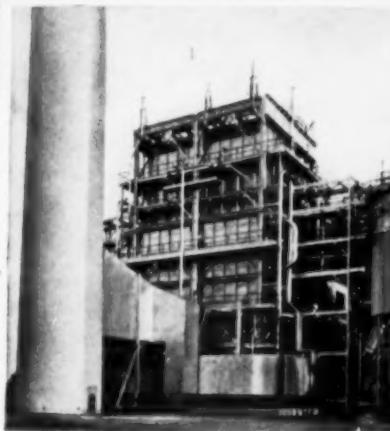
New York Washington, D. C. Bradford, Pa. San Francisco Houston,
Dallas, Gregston, Pampa and Odessa, Texas Seattle Tulsa Shreveport
St. Louis Los Angeles Chicago Caracas, Venezuela Cooper-Bessemer of
Canada, Ltd., Halifax, Nova Scotia Gloucester, Mass. New Orleans, La.

FOUR MORE OUTDOOR

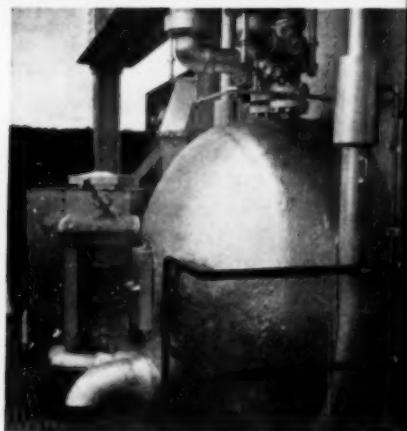


Lake Catherine Station of the Arkansas Power and Light Company.

All Units
Engineered By:
EBASCO SERVICES INC.



Foster Wheeler steam generator of the outdoor-type installed at the Arkansas Power and Light Company. Typical of those installed at Louisiana Power and Light Company, and Mississippi Power and Light Company.



Section of steam drum with external weatherproof covering protruding through water-tight, air-tight steam generator casing.

STEAM GENERATORS!



Foster Wheeler outdoor-type steam generators, each of 900,000 lb per hr capacity, now serving

Lake Catherine Station.....1 unit

ARKANSAS POWER AND LIGHT COMPANY

Ninemile Point Steam Electric Generating Station.....1 unit

LOUISIANA POWER & LIGHT COMPANY

Delta Steam Electric Station.....2 units

MISSISSIPPI POWER AND LIGHT COMPANY

Reflecting the wide acceptance of the outdoor-type steam generator, these four Foster Wheeler units are all serving power plants in the South. Because of the traditionally mild climate in these areas, the minimum of weather protection is required for personnel, steam generating units and auxiliaries. This same basic design has proved practical and economical in the Northern States, the only difference being in the extent of weather protection provided.

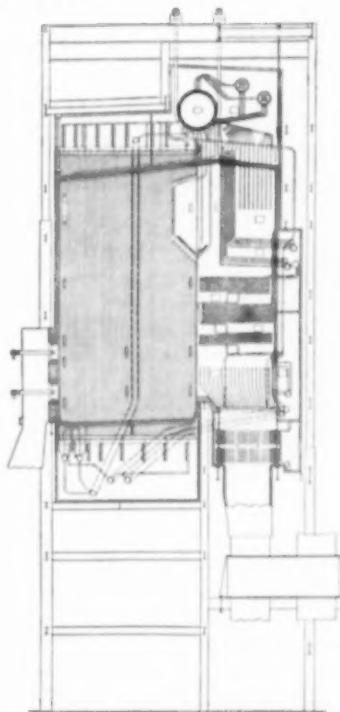
Each of these new steam generators has a capacity of 900,000 lb per hr continuously, and 950,000 lb per hr for an eight hour peak. Each delivers steam at 1550 psi and 1005F at the superheater outlet.

A superheat control condenser maintains steam temperature constant over an operating range from 600,000 lb to 950,000 lb per hr.

Because of the proven economy and suitability of outdoor-type construction under a wide variety of climates, Foster Wheeler units, such as these, bring a new abundance of low-cost power to help promote the industrial growth of the regions they serve.



The 145 ton drum of the Foster Wheeler outdoor-type steam generator being placed in position on structural steel framework at Lake Catherine Station.



Cross-sectional elevation of the Foster Wheeler 900,000 lb per hr outdoor-type steam generator. Arrangement provides for modification of furnace for future pulverized coal firing.

FOSTER WHEELER

FOSTER WHEELER CORPORATION
165 Broadway, New York 6, N. Y.

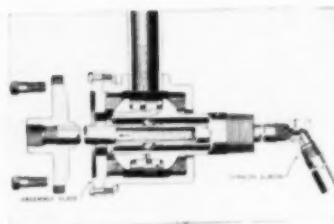
new equipment (continued)

For more data circle item code number on the postage free post card — P. 17

Rotary Pressure Joint

D-8 JOHNSON CORPORATION, Three Rivers, Mich., announces two new developments for reducing maintenance time in the insertion and removal of mechanical siphon pipes in rotating rolls or drums that require the insertion of steam or other liquids and the removal of condensate.

Type J Rotary Pressure Joint is available with a special assembly plate, which serves to hold the internal parts of the joint in position when the head is removed. The siphon pipe can thus be removed without disturbing the joint proper or the steam inlet connection. All Type J Joints, 1 in. and larger, are designed so that assembly plates can be added at any time.



The new Johnson siphon elbow and new assembly plate are shown in this cross-section of a Type J Johnson Joint.

In addition to the assembly plate, another new product of the company is a hinged siphon elbow. Two straight pipes may be threaded to this elbow, eliminating the need for a curved pipe serving as a mechanical siphon pipe. As the first pipe is inserted in the roll or drum, its weight closes the elbow, which enables the stainless steel seat to create a closed line that is both leak proof and pressure proof.

Magnetic-Drive Pump

D-9 PEERLESS PUMP DIVISION, FOOD MACHINERY AND CHEMICAL CORPORATION, 301 West Avenue 26, Los Angeles 31, Calif., has announced a pump, in which liquids are completely isolated and confined to the wetted end, and which presents no rotating connection whatsoever between the driven pump end and the liquid pump end.

This new magnetic-drive horizontal pump has no rotating seals, no packing, no rotating member between the driver and the driven unit.

The complete sealing-off of the liquid end of the pump is accomplished by the employment of a true magnetic-drive. Power is transmitted from motor to pump by employing the simple principle of matching magnetic fields, from adjacent opposite poles, mounted around the periphery of the driving and driven elements. A circular disc, with 12 to 24 permanent magnets (depending upon pump size) is attached to the rotating motor shaft; this drives a similar size permanent disc magnet and impeller unit, which is attached to and rotates around a stationary shaft in the li-

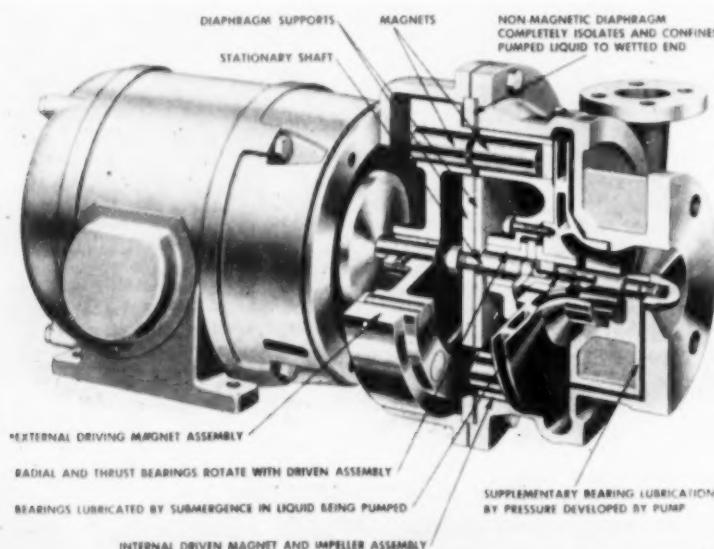
Master Precision Level

D-10 THE LUFKIN RULE COMPANY, Saginaw, Mich., is offering the new Master Precision Level Number 59 for application in machine shops, inspection departments, tool rooms, and millwright departments.



Lufkin's No. 59 level, 15" long, 3" high, and 1 1/2" wide, weighs approximately 6 lb. It sells for \$75.

This precision level features ground and graduated vial of 10 second accuracy, with one division equalling .0005 of an inch per foot. The special alloy base is less affected by temperature changes and the top plate is made of special non-conductive insulating material. Screws have 64 threads per inch for fine adjustments. Auxiliary level shows lateral position.



quid end of the pump. A non-magnetic diaphragm is employed to completely separate the driven or liquid end of the pump from the driving end of the pump. Because of this separation, and because no rotating connection is maintained between the two ends, liquid being pumped in the liquid end is confined to that end and cannot escape from it.

The magnetic-drive pump is an end-suction, horizontal centrifugal type unit. It consists essentially of an electric motor, with a permanent driving magnet assembly attached to the rotating motor shaft at driving end. The driven end, or the liquid end, is comprised of the driven magnet and impeller assembly, rotating thrust and radial bearings, a stationary shaft, the pump volute case, with end suction and top discharge. Bearing lubrication is effected by liquid being pumped.

Magnetic-drive pump applicable to processes where a closed system of liquid flow is necessitated, where contamination to the liquid bearing pump cannot be tolerated, or where leakage of the liquid handled is not permissible.

Possible uses: on liquid lines handling hazardous, toxic or odoriferous liquids, and for pumping extremely hot or cold liquids as well as those with highly corrosive properties. Fluids handled in actual operation include: ammonia, liquid chlorine, organic acid and water.

For more data circle item code number on the postage free post card — P. 17



3¢

just saved me
900 dollars

THAT'S what I said—3 cents. The cost of a postage stamp—the stamp I used to mail an inquiry to National Tube.

You see, we just put an addition on the plant. It was my job to specify the pipe and tubing. I had decided to buy NATIONAL Seamless because we'd already used it with great success for boiler-feed lines as well as main steam piping.

However, the higher temperatures and pressures we planned to use made me a little apprehensive as to the analysis I should select. After a good deal of thought, I chose a high alloy steel in a heavy-weight seam-

less grade. I prefer to keep on the heavy side of weight tolerances rather than on the light side. It's safer.

Before I turned in my recommendation for the analysis, though, I decided to ask National Tube about it—just to be sure. That's when I stuck that lucky 3-cent stamp on the envelope and sent it to National's district office.

A National engineer came out, looked the plant over, did a little figuring, and handed me the *correct* analysis.

The pipe and tubes I had specified were good—but just a little *too* good

for the job. When the costs were figured, the material recommended by National Tube was 900 dollars *less* than the type I had selected. And the advice hadn't cost me a cent.

Let me tell you—National Tube helps make sure you get the *right* pipe or tube for the job, everytime. And at the least cost to you. So why take chances?



NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
(Tubing Specialties)

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S NATIONAL Seamless PIPE AND TUBES

UNITED STATES STEEL

SAVES TIME • MUSCLE • MONEY



This True Ball Joint Makes the Difference

Darts give a snug, drop-tight fit easily — without fussing or excessive wrenching — there's no lost time in installation. Yes, and you can use Darts over and over again on many different installations for real economy!

QUICK FACTS

- *Leakproof* because precision-machined to a true ball joint and spherically ground
- Bronze alloy seats are extra wide, resist pitting and corrosion

- Shoulders are heavy — withstand abuse
- Practically indestructible Nut and Body . . . of air-refined, high test malleable iron

Insist on Darts — they're a real *investment*



DART UNION COMPANY • PROVIDENCE 5, RHODE ISLAND
The Fairbanks Co. — Distributors: Boston • New York • Pittsburgh • Rome, Ga.

new equipment (continued)

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Automatic Valve Operator

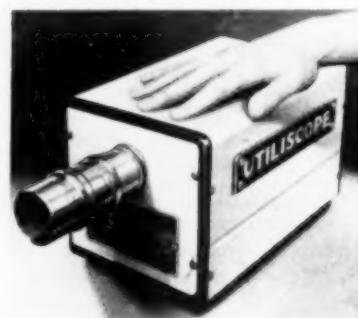
PHILADELPHIA GEAR WORKS,
INC., G St. below Erie Ave.,
Philadelphia 34, Pa., announces a new, improved type "SMA"
LIMITORQUE automatic valve operator.



Features include: greater torque, thrust and stem capacity; easier de-clutching; easier handwheel operations; 2-piece stem nut design, which permits changing unit from one valve to another; improved switch design and electrical arrangement; torque control for both directions of stem travel, or just in a single direction, if desired.

New Model Camera For Wired Television

DIAMOND POWER SPECIALTY CORP., Lancaster, Ohio, has developed a new small camera having high resolution and using lower lighting levels for industrial television installations.



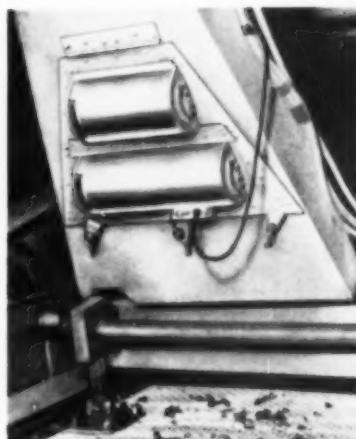
This camera, Model 300-BV, can be used instead of or interchangeable with the standard "Utiliscope" Model 300-B camera. It compares favorably in simplicity of operation and requires no trained operating personnel. It features easy accessibility for servicing.

The camera can be placed in practically any location, no matter how remote, dangerous or inaccessible. One or more viewing screens are located wherever convenient to the operators. The many applications include: watching water level and furnace conditions in big power boilers; observing interiors of steel heating furnaces; viewing dangerous and destructive tests; guarding plant gates; supervising manufacturing operations from a distance; inspecting sensitized film.

Warning System for Magnetic Separators

D-13 ERIEZ MANUFACTURING COMPANY, Erie, Pa., has announced the development of a completely automatic alarm system for magnetic separators.

The new control, called Magnalarm, does its "thinking" by means of a sensitive ferrometer which constantly measures the quantity of tramp iron as it accumulates on the magnet's surface, and which reacts on a circuit to trip the alarm as soon as a predetermined accumulation is reached. Standard types of alarms—lights,



Automatic insurance—it rings a bell, lights a light, and stops a machine.

belts, buzzers, etc.—are optional, as is also the location of the alarm, which may be at the machine itself, or in a remote office, or both.

By automatically alerting maintenance men when the magnetic separators need cleaning, Magnalarm insures that these vital magnetic controls will always be working at optimum efficiency. Unless the alarm

sounds, the operator knows that no inspection is required; production can continue without interruption.

Electric Fork Truck For Hazardous Areas

D-14 CLARK EQUIPMENT COMPANY, Battle Creek, Michigan, is offering its line of Clark Electric Carloaders, which have been modified to receive UL approval for operation in atmospheres containing explosive vapors.

Modifications include a special frame and totally enclosed explosion proof panel, master switch and resistor, limit switches for the seat brake, foot brake, hydraulic control valves, pump motor and drive motor. Static-conductive cushion tires as well as special explosion-proof plugs are used on these machines.

To prevent spark-jumping, sealing Unilets or boxes are inserted at various points in the circuit, such as between plug and battery, master switch and panel, panel and seat brake, panel and resistor, panel and foot-brake limit switch and valve limit switches. The boxes are packed with special

CONSECO IS APPROVED...

... IN INSTALLATION AFTER INSTALLATION!

The CONSECO name is well known for dependability. That's why in modern power plants all over the nation CONSECO equipment gets the stamp of approval that comes from proven performance. CONSECO engineers are specialists in heat exchanger equipment and their experience as well as CONSECO production facilities and methods are available to assist you in securing worthwhile SAVINGS in your plant.

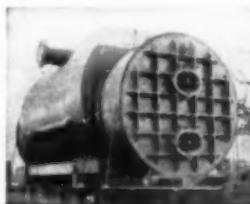
Consult these experts about your condenser and heater needs. They will be glad to tell about the advanced features which assure trouble-free, low cost performance in your plant. WRITE today for helpful engineering bulletins on CONSECO condensers and other equipment for power, process and utility plants.



CLOSED HEATERS



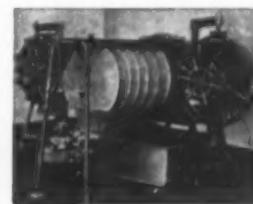
DEAERATORS



CONDENSERS



EVAPORATORS



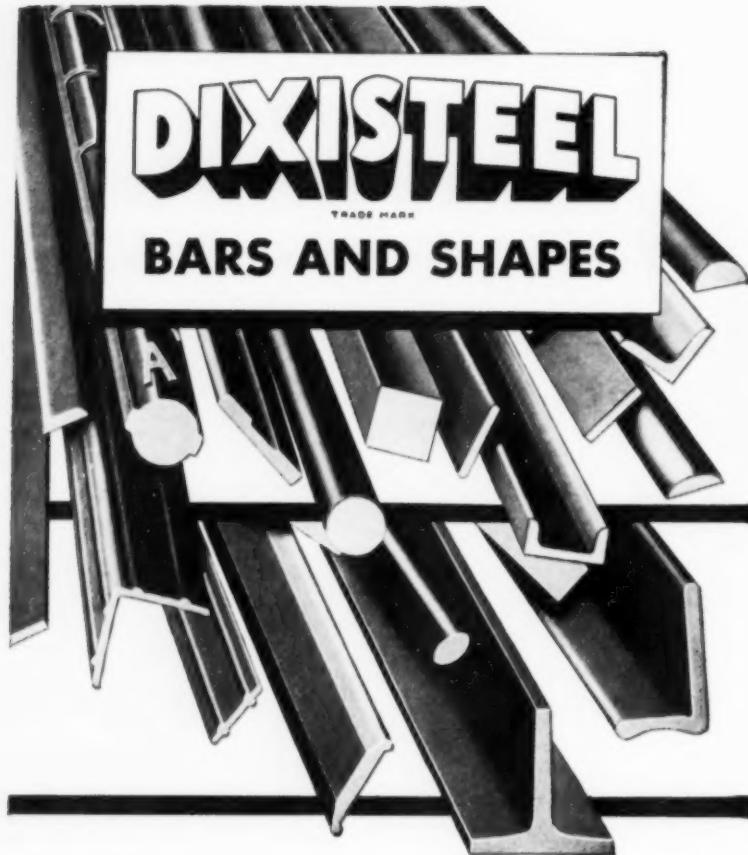
REFINER FILTERS

CONDENSER Service & Engineering Co.

154 Observer Highway, Hoboken, N. J.
Hoboken 3-4425 N. Y. Tel: BA 7-0600



PRODUCTS INCLUDE: COOLERS • CLOSED HEATERS
DEAERATORS • EVAPORATORS • STEAM JET EJECTORS



FLEXIBLE ROLLING SCHEDULES

The great variety of shapes, sizes and grades of DIXISTEEL Bars and Shapes has always been a plus value to Southern manufacturers and fabricators. Now, new flexible rolling schedules make it more to your advantage than ever to do business with Atlantic Steel—one of the nation's completely independent steel producers.

Call, write or wire for information and prices.

• PLAIN OR GALVANIZED



Atlantic Steel Company

ATLANTA 1, GEORGIA • EMERSON 3441

new equipment (continued)

For more data circle item code number
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To obtain UL approval, standard Clark Electric Carloaders have been modified to make them explosion-proof.

material that absorbs and snuffs out any sparking.

As a further precaution, there is no key switch on the steering column. Instead, the switch is incorporated on the battery and serves the dual purpose of closing the circuit and locking the plug and receptacle together.

Intake Air Filter for Engines & Compressors

AMERICAN AIR FILTER CO., INC., 215 Central, Louisville 8, Ky., is offering the Type FS intake air filter for small portable or stationary engines and compressors.

The new filter employs rayon flocked screen wire as the filtering medium. This is the same material used for combat plane carburetor in-



Filter is made in seven sizes, giving capacity range from 50 to 800 cfm. A weather shield is available for outdoor installations.

take filters. The rayon flock is bonded to the 14 mesh galvanized screen wire with a thermo plastic bond that is impervious to gasoline or other solvents and permits a wide choice of cleaning methods.

The Type FS filter may be operated either dry or oil coated with very little difference in cleaning efficiency, but when oiled the dust holding capacity is comparable to that of a viscous type filter.

An inner perforated screen baffle serves to equalize the air flow and protect against backfire.

Foot-Controlled Milvise

D-16 STUDEBAKER MACHINE CO., 1221 S. 9th Ave., Maywood, Ill., recognizing that operators of drill presses, milling machines, surface grinders, shapers, boring machines and cut-off saws constantly experience a need for a device that will hold work in a solid grip while operations are being performed, has made available a Milvise that can be mounted on machine or bench.

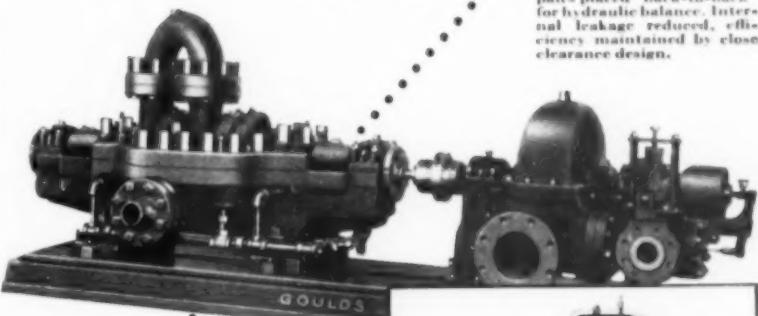
Hydraulic pressure is obtained by a foot-operator equipped with applicator pedal that moves rear jaw of vise forward to grip work; another pedal applies pressure to maximum and the third breaks pressure-jaw automatically moves back for release of work.

Construction of Milvise is steel. Jaw faces are aligned parallel to .001 inch accuracy. Cross slots and side ears are provided so Milvise can be bolted either lengthwise or across work table. V-ways and gibbs assure straight line movement and square gripping between jaws.



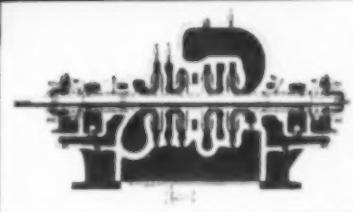
Hydraulic foot-controlled unit holds work with pressure from a few pounds to 5 tons.

Keep Efficiency Up —



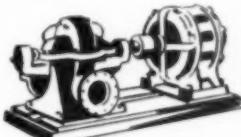
GOULDS Fig. 3360
Single-suction impellers in pairs placed "back-to-back" for hydraulic balance. Internal leakage reduced, efficiency maintained by close clearance design.

*Costs down
with Goulds*



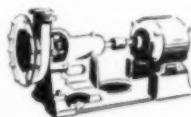
High Pressure Centrifugal Pumps

Other GOULDS Pumps for Heavy-Duty Service



GOULDS Fig. 3450

These double-suction, single-stage Goulds centrifugals will handle up to 15,000 G.P.M. Heads up to 300 ft. Bulletin 721.2.



GOULDS Fig. 3705

Stainless steel pump for handling acid and alkaline liquids. Capacities up to 600 G.P.M. Heads up to 160 ft. Bulletin 721.2.



GOULDS Fig. 3047

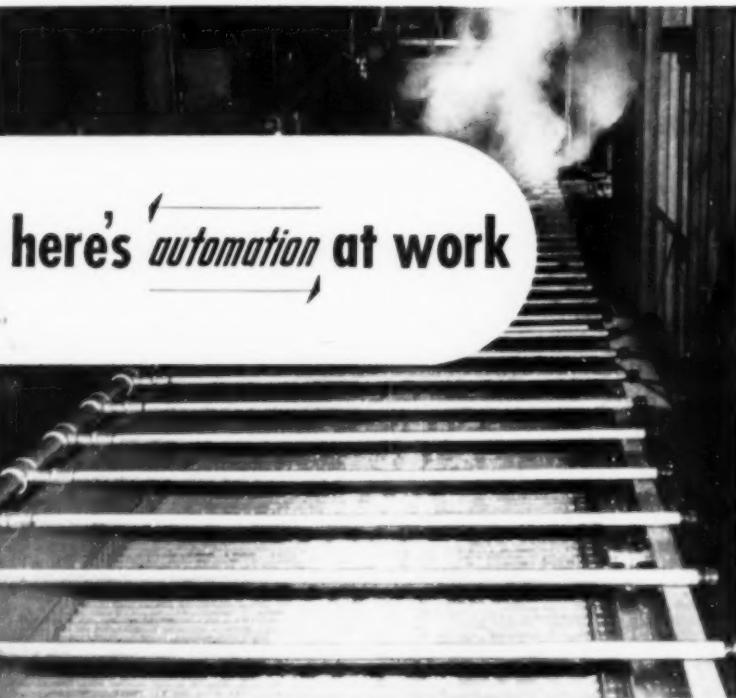
Non-clogging impeller of this vertical sump pump will handle water containing large solids or fibrous materials.

In power plant boiler feed service or other installations where high pressures and temperatures are encountered, it will pay you to specify Goulds High Pressure Centrifugal Pumps.

Low in cost and easy to install, they assure real economy. Goulds save you money while in operation, too. Their simple, durable construction provides years of 24-hour-a-day trouble-free service . . . means lower replacement costs and reduced maintenance for you.

The Goulds Fig. 3360, pictured above, is available in bronze fitted construction with heavy-duty, double ball bearings, in sizes 3" to 8", stages 2 to 8, capacities to 2250 G.P.M. Heads to 3050 ft. Bulletin 722.5 contains details and specifications. Write for it today.





here's automation at work

with a **CAMBRIDGE**

WOVEN WIRE CONVEYOR BELT!

Cut corn is blanched, cooled and frozen on Cambridge Woven Wire Conveyor Belts. Entire operation is continuous and automatic, requires no manual handling until discharge from freezing tunnel.

Regardless of whether your process temperatures range from sub-zero to as high as 2100 F . . . whether you use water rinses, acid pickles or other corrosive processes . . . a Cambridge woven wire belt can help you cut manufacturing costs by contributing to automation . . . continuous, automatic production.

Cambridge belts are all metal and can be woven from any metal or alloy. Thus, they are impervious to damage from heat, cold or corrosive conditions. That's why they can be used to process parts or materials while moving from one location to another.

Because of their open mesh construction they permit free circulation of process atmospheres, free drainage of process solutions. They are available in a wide range of specifications for carrying light or heavy loads, large or small parts.

Special raised edges or cross-mounted cleats to hold your product on the belt during flat or inclined movement are easily supplied.

Get the full story—FREE! Learn how Cambridge Woven Wire Conveyor Belts can help you boost efficiency by continuous, automatic production . . . automation! Write today for your copy of this manual of belt applications. It's the most complete text available.



Or, for immediate advice, call in your Cambridge Field Engineer. You can rely on him to make just the right recommendation for you. Look under "Belting-Mechanical" in your classified phone book, or write direct.



The Cambridge Wire Cloth Company

WIRE CLOTH METAL CONVEYOR BELTS SPECIAL METAL FABRICATIONS

OFFICES IN LEADING INDUSTRIAL AREAS

Lone Star Steel

(Starts on page 78)

60 kv auxiliary line enter the structure.

Steam Equipment

Installation of the new steam turbine required additional boiler capacity. This was obtained by the installation of 2 new outdoor boilers each having a capacity of 150,000 pounds of steam per hour on blast furnace gas and 225,000 pounds of steam per hour on natural gas. One of these boilers was required to take care of the steam requirements for the Navy and the second for the 15,000 kw turbine. One of these boilers is equipped with steam turbine driven forced and induced draft fans while the other has motor driven fans. Two new boiler feed pumps were installed, both motor driven.

Consideration was given to the use of higher steam pressure and temperature in the new installation but because of the low fuel cost and the fact that most fuel is a by-product, savings which could have been obtained from higher steam pressure would not justify the complications of a second steam pressure. The new boilers were, therefore, selected for 400 psig pressure and a total steam temperature of 750 F.

In the original plant no steam is extracted from any of the turbines to heat the feedwater. Exhaust from the steam auxiliaries is used to supply steam to the deaerating heater. It seemed highly desirable therefore, to utilize the new turbine for as much steam extraction as possible. Consequently, a new low pressure closed heater was installed and supplied with steam from the low pressure extraction line, designed to heat the feedwater of the entire plant to approximately 170 F. This will improve the economy of the steam plant due to the higher efficiency of the new unit as compared with the low efficiency of the small turbines. This unusual amount of extracted steam also reduces the load on the condenser.

Consideration was given to the installation of a high pressure closed heater to heat the water after leaving the deaerating heat-

er. But since the steam temperature characteristics of boilers are affected by feedwater temperature, it was found that such an arrangement would add to plant complications, and therefore was abandoned. An intermediate extraction line was installed connecting into the plant auxiliary exhaust line serving the deaerating heater.

Because of the variations in stage pressure with load it was necessary to install a pressure regulating valve in this line in order to maintain operation of the deaerating heater at constant pressure. A cross connection was installed from the high pressure extraction line with a second pressure reducing valve to provide a source of steam at extremely low loads. This rather unorthodox hook-up for a modern power plant works extremely well in this particular application.

LONE STAR STEEL COMPANY POWER PLANT PERSONNEL

Utilities Superintendent - W. P. Crews,
Asst. Utilities Supt. - Floyd V. Bullard,
General Foreman - Roy C. Ray, motor room;
Fred Farmer, instruments; Lester C. Walker,
maintenance; and G. C. Wright, Jr., combustion.
Turn Foremen (Power Plant) - Frank C.
Jacobs, Albert Coppedge, T. C. Walker,
Jewel Williams, and J. E. Baker.
Turn Foremen (Motor Room) - Jessie R. Stevens,
Clyde Konold, William B. Hensley, Jr.,
and Richard Barrett.

Gas Engines

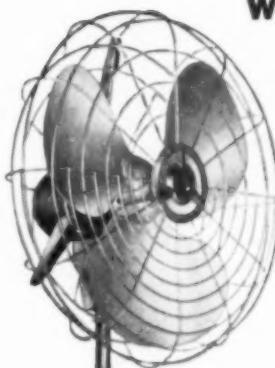
(Starts on page 88)

ratio necessary for maximum fuel economy. The 1,000 Btu natural gas reaches the plant at 140 psi and is reduced to 11 psi before admission to the cylinders. The high compression engine requires an igniting spark with high penetrating value and effective ignition is insured on this unit by four magneto with high energy induction coils.

Lubricating oil is circulated to bearings and for piston cooling by an engine-driven pump and, through mechanical lubricators, to the cylinders. Included in the crankcase circuit are a shell-and-tube oil cooler, an 8-element full-flow filter and a fullers earth cartridge by-pass filter. Cooling water is circulated by a motor-driven centrifugal pump through the finned tubes of a dry-type cooler with a variable-speed motor-driven fan.

CUT COSTS

with EMERSON-ELECTRIC
AIR CIRCULATORS

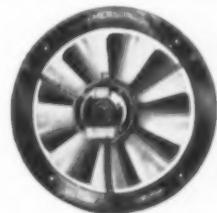


If stale, dead air handicaps your
employees and drives customers away,
it's costing you money.

You can cut this cost with Emerson-Electric Air Circulators. They move large volumes of air quietly . . . to keep "living conditions" inside your buildings comfortable and pleasant in all seasons. Don't let bad air add to your overhead . . . send for complete installation data today.

EMERSON-ELECTRIC AIR CIRCULATORS

Backed by the famous 5-Year Factory-to-User Guarantee, these powerful fans are available in 24" and 30" blade sizes, with two-speed, ball-bearing capacitor-type motors lubricated for 6,000 hours' service. Your choice of floor, counter, wall or ceiling mountings. For further information see your electrical contractor or write for Bulletin No 767.



EMERSON-ELECTRIC EXHAUST FANS CUT COSTS, TOO!

For complete ventilation of your buildings investigate Emerson-Electric's complete line of direct- and belt-drive exhaust fans, in capacities ranging up to 19,350 c.f.m. Write for new catalog No. 767-A.

THE EMERSON ELECTRIC MFG., CO., St. Louis 21, Mo.



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OR MATERIALS
AT ANY TIME OF
THE YEAR



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● This Niagara "Controlled Humidity" method gives you the **MOST EFFECTIVE** Air Conditioning because its cooling and heating functions are made completely separate from adding or taking away moisture. This assures you always a precise result. No moisture sensitive instruments are needed.

MOST FLEXIBLE. You can reach and hold any condition in response to instrument settings, or vary it as you wish.

EASIEST TO TAKE CARE OF. The machine is accessible, the control circuits are simple and easy to operate, and there are no solids, salts or solutions to be handled.

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INEXPENSIVE TO OPERATE. At normal atmospheric temperatures (unlike systems that use refrigeration to dehumidify) it needs no summer re-heat.

Write for Bulletins 112 and 122

NIAGARA BLOWER COMPANY

DEPT. SP, 405 LEXINGTON AVE. NEW YORK 17, N. Y.

Niagara District Engineers in Principal Cities of U. S. and Canada

News for the South

(Starts on page 8)

Westinghouse Names Clark S.E. Electric Heating Engr.

WARREN K. CLARK has been appointed as WESTINGHOUSE electric heating application engineer for the Southeastern States. His headquarters are at the Westinghouse apparatus office at 401 Sixth Ave. South, NASHVILLE, TENN.

Reared in Knoxville, Tenn., Mr. Clark was graduated from the University of Tennessee in 1950. He entered military service immediately upon graduation and after his discharge he joined the Westinghouse Electric Corporation.

World Trade Inst., Houston

Plans are progressing for Houston's first World Trade Institute to be held May 17 to 20 at the University of Houston.

The institute, which will serve as a training course for executive personnel in the foreign trade field, will have a number of outstanding speakers, including Dr. Marvin Fair, professor of economics and transportation at Tulane University and director of that university's Institute on Foreign Transportation and Port Operations.

Sponsor of the four-day meeting is the world trade committee of the Houston Chamber of Commerce and other foreign trade organizations in the city.

Flexible Steel Lacing, S.E.

VERTNER S. KENERSON is now representing FLEXIBLE STEEL LACING CO. in the CAROLINAS, VIRGINIA and EAST TENNESSEE.

Mr. Kenerson, with headquarters in Raleigh, N. C., has taken over part of the area formerly covered by Austin Webster who retired earlier this year. The company manufactures belt fasteners for joining conveyor, transmission and V-belts.

Ridge Tool Names Williams Representative in the South

THE RIDGE TOOL COMPANY, Elyria, Ohio, announces the retirement of C. O. HOLLON, sales representative of the company since 1925 in New Jer-

sey, Pennsylvania, MARYLAND, DELAWARE, VIRGINIA and WASHINGTON, D. C.

M. B. WILLIAMS takes over the sales in the District of Columbia, Maryland, Delaware (except Wilmington), Virginia and North Carolina. His address is 7301 Ft. Foote Road, S. E., Washington 22, D. C.

Temco Promotes Ferguson

VERNON N. FERGUSON, TEMCO AIRCRAFT CORPORATION's chief industrial engineer, has been elevated to assistant factory manager at the company's Dallas plant. Mr. Ferguson, who left a faculty position at the University of Texas to join TEMCO two years ago, will assist Factory Manager Don Balfour.

William N. Rathbun, general supervisor of industrial engineering, succeeds Ferguson as chief industrial engineer.

Atlas Food Div.—Memphis

ATLAS POWDER COMPANY of Wilmington, Del., has started construction of esterification plants which will produce emulsifiers at Memphis, Tenn. and at Brantford, Ont. The company also has announced the establishment of a new Food Industry Division.

The plant at Memphis, larger of the two, will cost more than \$1,000,000 and is scheduled for completion by late 1954. Both plants will produce emulsifiers which the food industry uses in such products as shortening, ice cream and baked goods. These emulsifiers are also used in cosmetics, pharmaceuticals, surface coatings, textiles, cleaning compounds, petroleum production and refining.

Newport News Shipbuilding Elects Blewett & Rawlings

NEWPORT NEWS SHIPBUILDING AND DRY DOCK COMPANY, NEWPORT NEWS, VIRGINIA, has announced the election of WILLIAM E. BLEWETT, JR., as president of the company. Blewett, who has been executive vice president since 1947, is the seventh president in the sixty-seven-year history of the yard. His election marks a continuation of a practice inaugurated in 1911 of selecting the chief executive officer from within the organization.

N. L. RAWLINGS, previously vice president and general manager of the company, has been elected executive vice president and general manager.

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PLATFORM TRUCKS



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Series 21 **LOCK-WELD SWIVEL CASTERS** eliminate the greatest cause of caster failure: the king pin.



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Each coat has the same tough durable lead base assuring excellent adhesion and eliminating the possibility of film separation, peeling, chipping or cracking. As the lead film wears thin, the established coat can be built to original film thickness and its life extended for another long period — no special primers or finishers required—with just one single maintenance coat.



Subox Inc.

6 FAIRMOUNT PLANT HACKENSACK, N. J.

news (continued)

Laclede-Christy, St. Louis

LACLEDE-CHRISTY COMPANY, ST. LOUIS, Mo., has announced the appointment of G. A. FUCHS as General Superintendent—Fire Brick Division.

Mr. Fuchs will be responsible for the operation of all of the company's fire brick and silica plants. He joined Laclede in 1948, and during this time handled labor relations and was manager of high alumina and silica sales until his recent promotion.

ASTE Exposition Scheduled Apr. 26-30—Philadelphia

The ninth biennial exposition sponsored by the 28,000-member AMERICAN SOCIETY OF TOOL ENGINEERS is scheduled for Philadelphia's Convention Center April 26-30. More than 480 exhibitors will occupy approximately 155,000 sq ft. The 1954 Exposition will be the largest in the history of the series which started in Detroit in 1938.

Topics for the conferences range through the entire field of manufacturing practices. Highlights will be: full automation, employee planning participation, and industrial uses of Nucleonics. Production problems will be analyzed. Practically all the "stiff competition" technical developments will be covered.

Basic Materials Conference Scheduled for May 17-20

The BASIC MATERIALS CONFERENCE will be held concurrently with the BASIC MATERIALS EXPOSITION at the International Amphitheatre, Chicago, May 17-20.

The meeting will open with a review of new developments in basic materials during the past year. One session will consider the use of new metal forming processes, while another will be devoted to when and how to use non-metallic materials. Also scheduled is a discussion of the use of materials which combat erosion and corrosion, and another on adhesives and adhesive bonding of metals and plastics.

Scores of displays will show the advantages and new uses of the thousands of new materials now available to manufacturers.

A group of 14 leading industrialists is serving as a board of sponsors for the exposition. Don G. Mitchell, chairman of the board, Sylvania Electric

Products, Inc., New York, is chairman of the sponsoring group.

Visitors who wish to attend either the show or conference may obtain advance registration cards from Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

Westinghouse Award—Ala.

The WESTINGHOUSE LAMP DIVISION plant, REFORM, ALABAMA, which has been in operation for about 19 months, has captured the division's inter-plant award for five successive months, Works Manager JOHN J. ROSKOS announced recently.

The monthly contest evaluates the work of employees in all of the division's manufacturing plants located at BLOOMFIELD, BELLEVILLE and TRENTON, N. J.; FAIRMONT, W. Va.; RICHMOND, Ky.; PARIS, TEXAS; LITTLE ROCK, Ark., and the Alabama plant, which manufactures photoflash and Christmas tree lamps.

Diamond Alkali—Houston

DIAMOND ALKALI COMPANY, Cleveland, Ohio, has announced the appointment of a new works manager at the company's HOUSTON, TEXAS, plant.

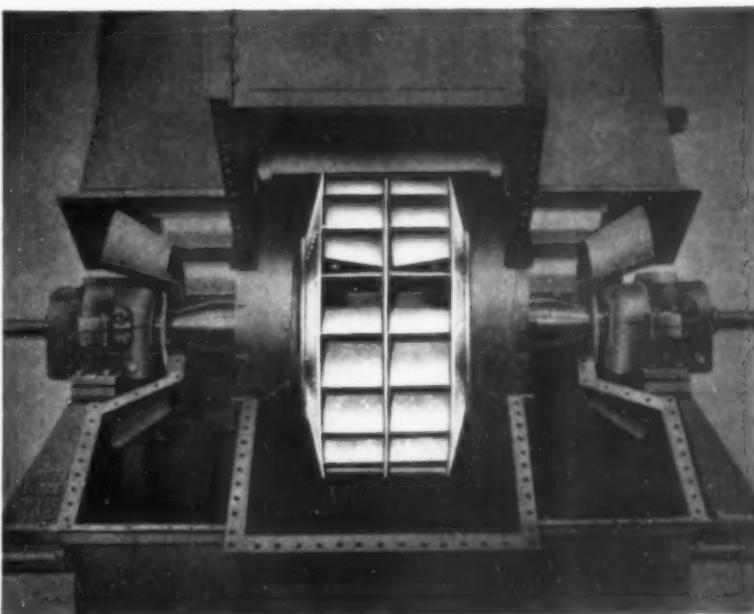
C. E. LYON, vice president of the company and works manager of the Houston plant since it was constructed and put into production in 1948, has been named General Manager of the company's new Chlorinated Products Division. FRANK CHRENCIK has been promoted to succeed Lyon as works manager of the Houston plant. He has been assistant works manager there for the past six years, and was previously superintendent of Diamond's Edgewood, Md., electrochemical plant.

P. A. Duke—Atlantic Steel

PAUL A. DUKE has joined the Fabricating Division of ATLANTIC STEEL COMPANY as Sales Engineer. In this new capacity, he will handle sales of fabricated reinforcing bars, welded wire mesh and accessories to the construction field.

Duke became associated with the company in 1948, and in 1949, he helped establish the Product Engineering Department. Two years later, he was active in the installation and initial operation of the company's new electric furnace, the largest in the Southeast. He is a graduate of Georgia Tech, with degrees in mechanical and industrial engineering.

How a FAN ROTOR Delivers CHEAPER POWER



... in "Buffalo" Induced Draft Fans

Inside the "Buffalo" Induced Draft Fan is a hurricane — a hurricane of hot, erosive fly-ash being drawn from the boiler firebed by a rotor like the one above. We don't have to tell you how quickly this could literally destroy an ordinary rotor — nor how expensive replacement would be. Yet the "Buffalo" rotor is built to "take-it" for a long period. Heavy gauge steel used throughout; backward curved blades for extra stiffness and efficiency —

tapered side flanges cut from a solid plate — floor plate wearing strips with angular ridges to reduce erosion — heavy hub solidly bolted to the center plate. And all other parts of the fan — housing, shaft and bearings — are built to "go the distance" for you, which naturally means cheaper power. It's all part of the "Q" Factor* that's in every "Buffalo" Fan. You'll see full details in Bulletin 3750. Write for your free copy today!



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VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING
FORCED DRAFT COOLING HEATING PRESSURE BLOWING

Atomic Powered Locomotive Designed

By JOHN F. LEE

Associate Professor of Mechanical Engineering
North Carolina State College, Raleigh, N. C.

NO SOONER had the first atomic powered submarine *Nautilus* been launched than the design of an atomic powered locomotive was announced by Dr. Lyle E. Borst, Professor of Physics at the University of Utah. Although Dr. Borst was extremely careful to point out that there are no immediate plans to construct such a locomotive, it is significant to note that engineers from five major railroads and six engineering firms cooperated in the design.

The atomic powered locomotive proposed is designed for an output of 7,000 hp and will cost an estimated \$1,200,000 to build. A comparable three-unit diesel combination would cost something in the neighborhood of \$750,000. However, the atomic powered locomotive could be operated continuously for twenty-four days before refueling would be necessary. Under

normal operating conditions this would mean refueling about six times a year.

Furthermore, from the standpoint of fuel costs there appears to be a balance in favor of the atomic powered locomotive as compared with the best diesels. Unfortunately, it is difficult to give concrete cost figures in this area because of the variability of utilization and diesel fuel charges, and the fact that the cost of uranium is classified information. A reasonable estimate based on average conditions would indicate that the annual fuel cost for the atomic powered locomotive would be approximately 85% of that for a comparable diesel.

Operational Data

The atomic powered locomotive is designed to operate on high pressure steam generated in 10,000 tubes lo-

cated in a reactor fueled with a chain-reacting solution of uranyl sulfate. In effect, the reactor takes the place of a boiler. Steam generated in the reactor would flow to a steam turbine equipped with an air-cooled condenser. The cycle would be closed with the condensate returned continuously to the reactor. The turbine would be the prime mover for four d-c generators powering the traction motors. The drawings show that the locomotive would be in two sections mounted on a total of 24 wheels. The overall length of the entire locomotive would be 160 ft and it would weigh approximately 200 tons.

Design Difficulties

Some practical difficulties would appear to be inherent in the design proposed by Dr. Borst. In the first place the turbine would be contaminated by radioactivity since the steam is to be generated directly in the reactor. It would seem that this difficulty could be overcome by using a liquid-metal coolant in the reactor. The liquid metal could then flow to a leak-proof heat exchanger to generate uncontaminated steam. This modification should not add materially to the cost, size and weight of the unit. Another difficulty lies in the absolute necessity for leak-proof construction throughout. After all, this locomotive would be in close proximity to passengers and other trains, and would of necessity pass through densely populated areas.

Although a new development of such a revolutionary nature is bound to meet with a certain amount of skepticism, it is reassuring to know that the design represents the efforts of a highly competent physicist and an experienced group of engineers noted for their conservatism. One is reminded that it was not too long ago that the gas turbine locomotive and even the diesel were viewed with a certain amount of skepticism.

G.E. Names Kennedy—Mo.

J. D. KENNEDY, formerly manager of product projects at Carboloy Department of GENERAL ELECTRIC COMPANY, Detroit, has been named manager of the Department's newly-created South Central sales district with headquarters in ST. LOUIS.

Kennedy joined Carboloy Department in Feb., 1948, as a general trainee. He later became a sales engineer, was named manager of wear part sales, and assumed his present duties in November, 1952.

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Hammer & Co.—Atlanta

PHILIP HAMMER has announced the establishment of a new firm, HAMMER AND COMPANY, to engage in economic research for business and government. Offices are at 809 Glenn Bldg., ATLANTA, GEORGIA.

H. H. Robertson Company Enters Electronics Field

H. H. ROBERTSON COMPANY, Pittsburgh, Pa., has purchased the controlling interest in an Ohio firm which produces a new device used to detect and measure vibrations in jet engines and other machinery.

Purchase of the International Research and Development Corporation of Columbus, Ohio, puts the Robertson company in the electronics field for the first time and provides it with a highly trained research staff. H. H. Robertson Company is a long established manufacturer of building products, synthetic resins and commercial asphalts.



Turbine For Alabama Power's Barry Plant

THIS turbine of a 125,000 kw turbine-generator for the Alabama Power Company is being assembled for test operation at the Turbine Factory of the General Electric Company.

Although the turbine rotor weighs almost 58,000 lb and operates with steam at an initial pressure of 1800 psi and initial steam temperature of 1000 F, some clearances are not much more than the thickness of a cigarette paper and finer precision is demanded than a jeweled watch.

The turbine is the second of two machines made by G.E. for the Barry Steam Plant at Salco, Alabama, near Mobile.

BIG KENTUCKY STEAM BOILER USES "TEAM- WORK" REFRactory WALLS, PORTS, BAFFLES



MASONS dip joints to speed laying up side walls of the boiler with Ironton STEEL Fire Brick (High Duty).



BURNER PORTS of the boiler are special shape brick made of Ironton's uniformly high P.C.E. Kentucky flint clay.

Any boiler installation is bound to give better service when all the refractories are engineered to work together. That's why experts prefer Ironton "Reliable Refractories" made from Kentucky high P.C.E. clays. Whether it's standard series fire clay brick, special shapes, or the new castable and insulating refractory concretes, Ironton ASSURES coordinated performance under specified service conditions.

TECHNICAL BULLETINS on all the materials used in the job pictured here will be sent on request. Get in touch with the Ironton representative in the nearest southern city, or write to the Bulletin Secretary at Ironton.



MONOLITHIC BAFFLE of castable refractory concrete saves brick mason labor, cuts costs as much as 100%.

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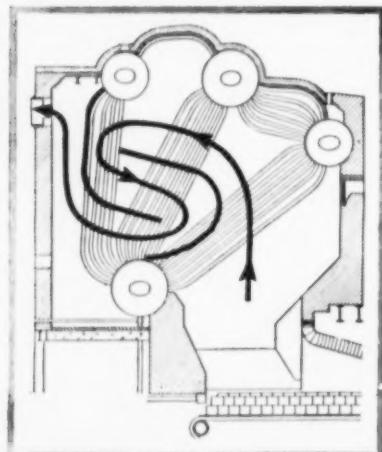
ASK FOR TECHNICAL BULLETINS ON NEW
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These important fuel-saving, maintenance-reducing features are obtainable with Enco boiler baffles — and only with Enco baffles.

- Streamlined gas flow
- Uniform gas flow
- Elimination of bottle necks
- Reduced draft losses
- Higher heat transfer
- Cleaner heating surfaces
- Less use of soot blower
- Special provision for expansion
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Each application is designed on the basis of more than a quarter century of experience in this specialized branch of power engineering. Installations are made by skilled mechanics.



THE ENGINEER CO.
Enco 75 West St.
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news (continued)

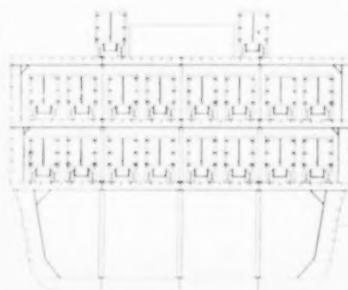
New "Sea-Land" Service Between South & East

Plans for McLean "Sea-Land" service, a new \$50,000,000 co-ordinated water and land system for transporting freight between the South and the East, were announced recently by M. P. McLean, President of MCLEAN TRUCKING COMPANY, WINSTON-SALEM, N. C.

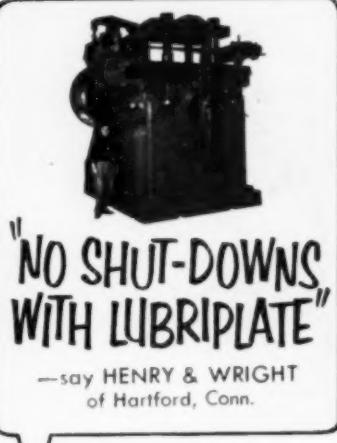
One of the nation's "top ten" motor freight systems, McLean Trucking Company expects its "Sea-Land" service to be inaugurated sometime next year. The first step in the new plan was completed recently when McLean Trucking Company acquired all the capital stock of S. C. Loveland Company, Inc., steamship and tug-and-barge water carrier serving all points along the Atlantic coast. An application has been filed with the Interstate Commerce Commission for approval of this transaction.

Construction of four large trailer-transport ships will begin when the merger is approved. Preliminary designs for these special ships are now on the drawing boards at Bethlehem Steel Company, Shipbuilding Division.

McLean "Sea-Land" service, the result of more than a year of research and investigation, will benefit the shipping public by providing the economies of lower-cost water transportation coupled with the flexibility of modern door-to-door motor freight service. Initially, the new ships are scheduled to call at one South Atlantic port, probably Wilmington, N. C., or



Stern cross-section of ship designed by Bethlehem Steel Company, Shipbuilding Division, for use in transporting fully loaded motor freight trailers between selected Eastern seaboard points, showing method of stowing trailers aboard. The newly designed ships will be utilized by McLean Trucking Company, Winston-Salem, N. C., in their new "Sea-Land" service to offer shippers the economies of water transportation combined with the flexibility of motor freight door-to-door pick-up and delivery service.



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Charleston, S. C., and two North Atlantic ports, New York and Providence.

New dockside construction which will be required includes adjustable loading ramps, yard space for up to 1,000 trailers and other conventional truck terminal facilities. The new ships for use in McLean "Sea-Land" service will be 650 ft long and have a speed of up to 20 knots.

Construction of the trailer-transport ships is expected to be accomplished with private capital. Nevertheless, the McLean project will be a material contribution to the nation's security requirements.

Time-In-Port Reduced

The average conventional coastwise vessel holds about 5,000 tons (about one trainload) and has five hatches. McLean "Sea-Land" vessels will hold about 3,500 tons of net payload cargo. A 5,000 ton, five-hatch ship must be loaded and unloaded through the hatches in sling loads, requiring about 60 hours. Complete loading and unloading of a "Sea-Land" vessel will take only about four hours. This tremendous saving of time-in-port alone is an important factor in maintaining a low-cost water service.

Permitting fully loaded motor trailers to be driven directly on and off the ships, automatically eliminates the costly movement of individual carloads, truckloads or fork-lift truck-loads to dockside for additional handling to stow the cargo aboard a conventional ship.

Dockside facilities in the new operation will be used only by the McLean "Sea-Land" service. The port facilities will be strategically located for easy access to arterial highways serving interior points.

While similar in some ways to other operations such as those transporting loaded rail cars over water, or even to the "piggy-back" development in which loaded trailers are forwarded overland on flat cars, McLean "Sea-Land" service is considered more practical and much more flexible. Successful applications of the same principle are found in the operations which transport loaded rail cars between Edgewater, N. J., and Gulf and South Atlantic ports, and between West Palm Beach, Fla., and Cuba.

The McLean co-ordinated system is designed to be of particular value to the motor carrier industry, as well as to the shippers who use it. The interchange between motor carriers generally of trailers for "Sea-Land" routing will be encouraged.

Operating personnel, and drivers

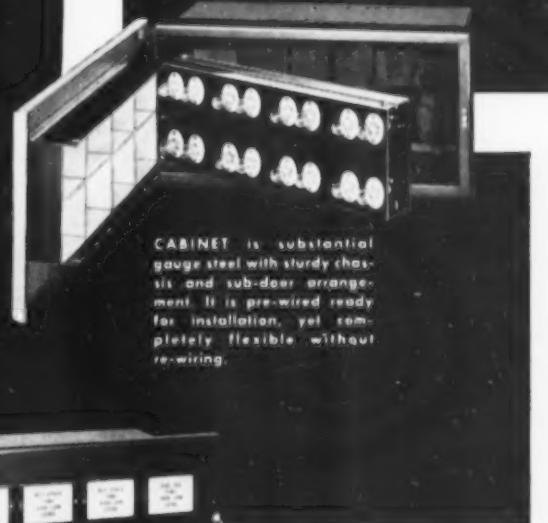
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Built-in flexibility of PANALARM "50" allows simple change-over to any operating sequence as required by present or future conditions. And, at the same time PANALARM "50" introduces a new instrument-type annunciation construction . . . adding to the long-term dependability of the entire system.



CABINET is substantial gauge steel with sturdy chassis and sub-door arrangement. It is pre-wired ready for installation, yet completely flexible without re-wiring.



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News for the South and Southwest (Continued)

particularly, will welcome the immediate and long-range improvements in working conditions. Many long two-to-four-day runs of all-land units will be replaced by more desirable short runs under the new system. Drivers will therefore enjoy better hours and have more free time to spend at home. Employment of drivers is expected to increase materially during the first year of operation of the new service.

Responsible officers of the Teamster's union, who represent the union drivers, have been advised of the McLean "Sea-Land" plan and of its effect on the employment of union personnel. No jurisdictional or other major problems of this type are anticipated.

McLean Trucking Company was founded by M. P. McLean in 1934. The company today is the largest motor freight Class I Common Carrier headquartered in the South, with 2,200 employees, 1,800 pieces of equipment, and 37 terminals from Atlanta to Boston.

Kewanee-Ross—St. Louis

KEWANEE-ROSS CORPORATION, Kewanee, Ill., is now being represented in the ST. LOUIS territory by DERCO

EQUIPMENT COMPANY, INC., 6219 Delmar Blvd., St. Louis 5, Mo.

DWANE E. BUSSE is manager of the newly appointed company, and JOHN B. FARROW and STANLEY W. SOUDERS are its sales engineers.

Texas Eastern Elects Naff

GEORGE T. NAFF has been elected president and a director of TEXAS EASTERN TRANSPORTATION CORPORATION, SHREVEPORT, LA. Mr. Naff has been executive vice-president of the company since 1948.

Diamond Alkali—Alabama

Appointment of HUGH D. MASON to the southeastern sales staff of DIAMOND ALKALI COMPANY, Cleveland, O., was announced recently by R. B. PERRY, Southern branch manager at MEMPHIS, Tenn.

In his new post, Mason will be the company's sales representative in ALABAMA for the complete line of basic chemicals, specialized detergents, custom-compound cleansers and related products having a wide application in industrial plants.

He makes his headquarters at 237 Montgomery Lane, Birmingham, Alabama.



Personnel Problems Discussed in Atlanta

At a recent meeting of the Georgia Chapter, American Society for Metals, FRANK J. JOHNSON (center), manager of personnel services, LOCKHEED AIRCRAFT CORPORATION, Marietta, Georgia, discussed his company's highly successful selection and placement plan for supervisory personnel.

With Mr. Johnson are PHIL DUFFY (left), southeastern district manager, LINDBERG ENGINEERING COMPANY, and JOHN BUTLER, assistant manager, warehouse division, ATLANTIC STEEL COMPANY, Atlanta, Georgia. Mr. Butler is current chairman, Georgia Chapter, ASM.

York-Shipley—Atlanta

YORK-SHIPLEY, INC., YORK, PA., announces the opening of an ATLANTA, GEORGIA, branch, for the sale and service of York-Heat and York-Power domestic and industrial automatic heating equipment and Shipley Home-air Conditioning.



I. Ben Kagey

The new branch, known as Southern York-Heat and Power, a Division of York-Shipley, Inc., is located at 305 Techwood Drive, N. W., Atlanta 3, Georgia, and will serve the Southeastern States. Mr. I. BEN KAGEY, a well qualified heating and air conditioning representative, heads the new branch.

Childers Mfg. Co., Houston Appoints New Representative

THE CHILDERS MANUFACTURING COMPANY, HOUSTON, TEXAS, has announced the appointment of the Jordan Engineering Company, Cincinnati, as sales and engineering representatives for Childers Aluminum Weather-Proof Jacketing in Southern Ohio.

Rust Founder Dies

STERLING MURRAY RUST, chairman of the board and a founder of THE RUST ENGINEERING COMPANY, died recently in Pittsburgh, Pa.

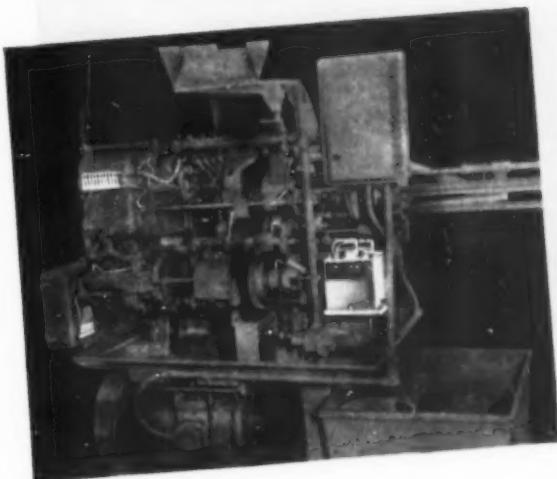
Mr. Rust was born near Leesburg, Va., in 1881, and received his education at public schools and at Woodberry Forest School and Kenmore School in Virginia.

In 1905 he joined with two brothers to form The Rust Engineering Company in BIRMINGHAM, ALA., which was at first a partnership. In 1913 Mr. Rust established a branch in Pittsburgh, which later became the company's headquarters.

Mr. Rust, who has lived at his estate near Leesburg, Va., since 1939, was well known throughout the South.

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Systems with various capacities and with both gravity and pressure feeds are adaptable to an endless variety of applications. Let experienced Manzel engineers show you how Pulsolator automatic lubrication can lower your costs and speed production efficiency. Write:



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COMBINATION
BURNERS

The LeTourneau Semisphere Building adjacent to the plant site of R. G. LeTourneau, Inc., at Longview, Texas. Cone-shaped hood at peak of the dome controls ventilation of building. Erection is handled entirely from ground level. A necessary preliminary is the installation of a steel center pole 94 ft high for

use in building erection. Pole may be left up when building is finished but is not necessary for support of the completed building. In photo at the right, concentric rings of acoustical material have been suspended from ceiling for sound control. Near top of center pole is a lighting installation of 75,000 watts.

Semisphere Building Design—Longview, Texas

No interior structural supports necessary in 85 ft high, 300 ft diameter LeTourneau designed building. Erection handled entirely at ground level. Completely erected, will sell at less than \$4 per sq ft of space afforded.

There are 3,289,402 cu ft of enclosed space and 70,686 sq ft of floor area in a huge new dome-shaped building just completed at Longview, Texas. There are no interior structural supports in this 85 ft high, 300 ft diameter building, and all of the assembly work to build it out of aluminum and steel was accomplished at ground level. This spacious structure, the LeTourneau Semisphere Building, is a product of R. G. LeTOURNEAU, INC., and was built adjacent to the LeTourneau Longview, Texas, plant and corporation headquarters.

These new structures provide weather-tight floor space and cubic capacity at far less cost than conventional methods of construction, and they can be erected quickly by semi-skilled labor.

The buildings are being considered for many functions: manufacturing, assembling, processing or packaging operations, merchandise warehouses, freight handling centers, heavy equip-

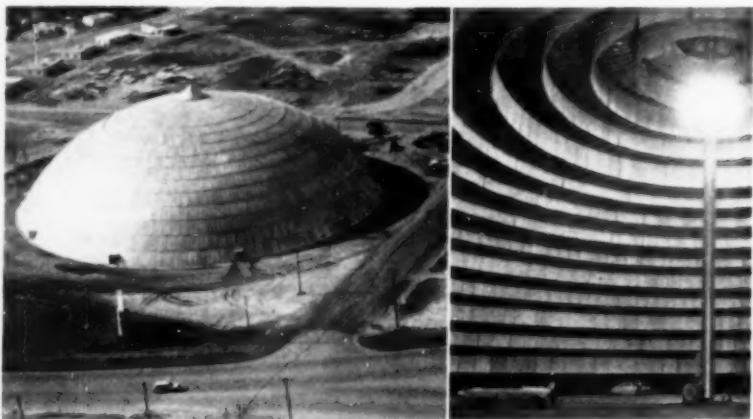
ment display or storage, automotive display, aircraft hangars, agricultural bulk products storage, commercial and civic entertainment, and indoor athletic facilities. Completely erected, the Semisphere Building will sell at less than \$4 per square foot of space afforded.

The new Longview building is a partial sphere, just as though an orange were cut in two, one piece being a little smaller than the other. The LeTourneau Semisphere is like the smaller portion. It is actually a segment of a sphere which, if complete, would have a radius of 173.2 ft. The wall at the bottom edge of the dome makes a 60-degree angle with the ground level. Head room is thus provided almost at the very outer edge of the building.

Assembly Method

Putting the LeTourneau Semisphere together is a case of building from the top down, but the building work

News for the South and Southwest (Continued)



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is all done on the ground. A necessary preliminary is the installation of a steel center pole 94 ft high for use in building erection. This pole may be left up when the building is finished, although it is not necessary for support of the completed building.

The dome begins to grow when a sliding steel collar—called the peak structure—is raised gradually up the center pole and 15 successive rings of aluminum sheets are bolted on. A LeTourneau electric winch does the raising. Jackstands steady the bottom edge of the partially-constructed dome during the attaching of each new ring of sheets. When the last ring is bolted on, the peak structure is 85 ft up the center pole. The lower edge of the completed building is then lowered and firmly secured to a foundation ring of concrete poured in advance to accommodate the building's circumference.

The clear, unobstructed interior makes the building adaptable to many purposes. Finishing details and utilities, such as interior surface treatment, lighting, heating, ventilation, air conditioning, acoustics and floor material can be whatever the building's function calls for. And within certain generous structural limitations, the size and number of entrances and exits can be varied to suit the end use requirements.

Ventilation of the Semisphere Building is assured by a 255 sq ft opening through the peak around the center pole. Sheltering of this opening and control of the volume of air passing through it is accomplished by a cone-shaped aluminum hood at the peak of the dome.

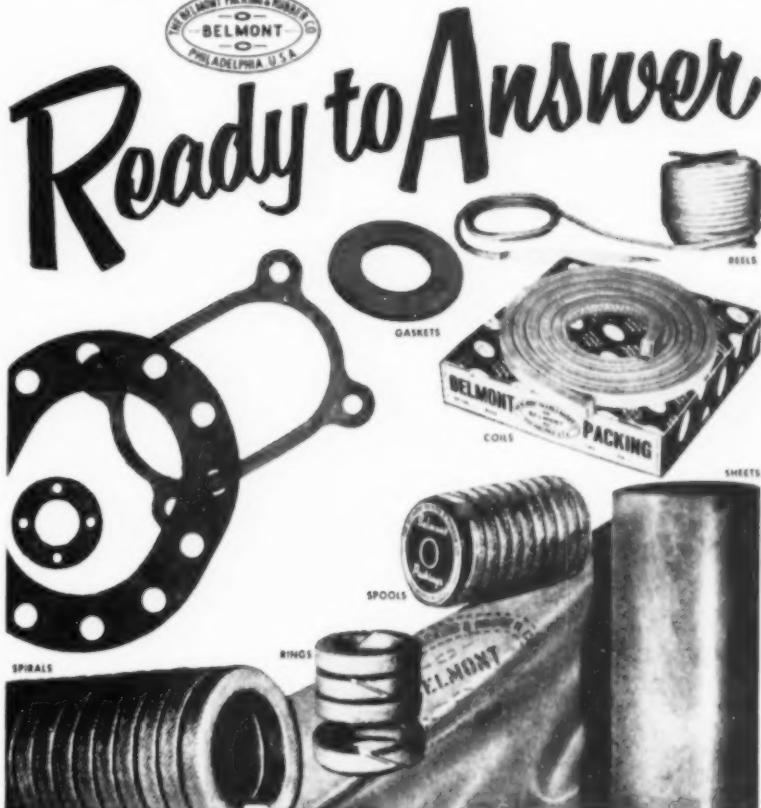
The LeTourneau Semisphere, when delivered, consists of aluminum sheets—curved, embossed, flanged and drilled—and all other necessary aluminum and steel parts. A crew of LeTourneau men supervises erection with the assistance of locally hired labor. Approximately 3000 manhours is the estimated requirement for the actual assembly of the building.

Wilson Leaves Atlanta for Carrier Home Office

MAURICE J. WILSON, sales engineer in the ATLANTA district office of CARRIER CORPORATION, has joined the Syracuse home office as a Product Specialist on Conduit Weathermaster systems.

Mr. Wilson, who has a degree in Electrical Engineering from Georgia Institute of Technology, joined Carrier 23 years ago as a control engineer.

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News for the South and Southwest (Continued)



Expansion Completed—Alcoa's Mobile Works

Expansion of facilities at the MOBILE ALUMINA WORKS of Aluminum Company of America has been completed, according to DUNCAN C. SMITH, Works Manager.

Capacity of the plant, now the largest alumina plant in the United States, was increased by 33% during the expansion program that began in October, 1951.

To supply the increased demand for bauxite resulting from the expansion, an additional 50 ore ships will be unloaded at Mobile each year. An additional 70 freight cars will be needed each week to ship the increased output of alumina.

The increased facilities will make available sufficient alumina to produce considerably over 100,000 tons of

aluminum metal per year. This increase in output for one year would alone be enough to keep Alcoa's new Rockdale, Texas, smelter operating for about 15 months.

The new equipment added at Mobile involved all facilities for refining ore under the Bayer Process. Among the several new installations were a digester unit, new filter presses and precipitators, and a new calcining kiln.

The powerhouse at Mobile was changed substantially. A new boiler, turbine, and air compressor were installed. New steam lines to supply the new digester unit were constructed.

A new storage building was erected to handle the greater supplies of ore that will be received from the Caribbean to fill the increased demand for raw material for the refining process. Conveyors were built to this building, other existing conveyors were enlarged, and bauxite handling facilities were expanded. The Alabama State Docks facilities for unloading bauxite were increased, in conjunction with Alcoa's expansion, to handle the greater incoming supplies of bauxite.

The new grinding facilities installed are a slight modification of earlier equipment. These facilities permit the handling of both dry and wet bauxites, whereas old equipment handles only dry bauxite.

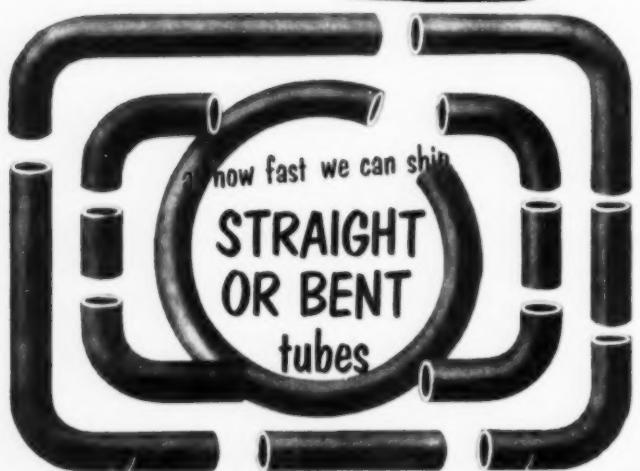
Kastner Manager of G. E. Transformer Apparatus Sales

CHRISTOPHER T. KASTNER has been appointed manager of transformer apparatus sales for the GENERAL ELECTRIC COMPANY, it was announced by J. W. Butler, manager of marketing for the Company's Power Transformer Department at Pittsfield, Mass. Mr. Kastner was formerly supervisor of medium transformer sales.

In his new position he will be responsible for the sales and promotion of medium power transformers, single-circuit and mobile unit substations, high voltage bushings, current-limiting reactors, high voltage testing equipment, furnace and rectifier transformers.

A graduate of Yale University with an M.E. degree in 1946, Mr. Kastner previously attended schools in Memphis, Tenn. He joined General Electric in July, 1946, on the Test Program. Following Lynn and Schenectady assignments, he came to power transformer sales at Pittsfield in July, 1947. On January 1, 1952, he was appointed supervisor of traveling specialists and later supervisor of medium transformer sales.

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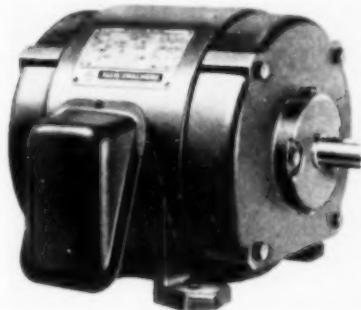
CHICAGO

FRED S. RENAUD & CO., LOS ANGELES

New Motor Design Announced By Allis-Chalmers Mfg. Co.

THE ALLIS-CHALMERS MANUFACTURING COMPANY's complete new line of alternating current squirrel cage induction motors in frame sizes 326 and smaller were shown to a group of editors and manufacturers during a recent two-day meeting at the company's Norwood, Ohio, plant.

F. J. GEIGER, manager of the electrical section, welcomed the visitors and pointed out that the new design of frame sizes up to and including 326 follows the newly established NEMA standards, which mark the first major change in frame reassignment for these sizes in 25 years.



In the new Allis-Chalmers Type G open-drip-proof motor the intake openings in the end shields will have far greater protection than in the old design. Located in the bottom half of the end shield, these openings are high enough above the base to minimize the probability of the incoming air sweeping dust or lint from the floor or base.

Allis-Chalmers showed their new open and totally-enclosed (fan-cooled and explosion-proof) models during the meeting. Geiger outlined the history of the NEMA rerate program. He cited the technological advances of the past quarter century, particularly in the development and application of new metals, insulation materials and heat transfer methods, as the principal factors which made rerating possible.

F. M. WINTERHALTER, chief engineer, electrical section, described the engineering and design features of the new line and emphasized that the redesign "means equal horsepower in a smaller package."

Application engineer E. F. GREIWE, in a comparison of construction and performance standards between the old and new designs, pointed out that the new motors (designated Type G) will retain all the important features of Allis-Chalmers "AP" line while offering certain improvements inherent in the redesign.

According to company officials, Allis-Chalmers new motors will be

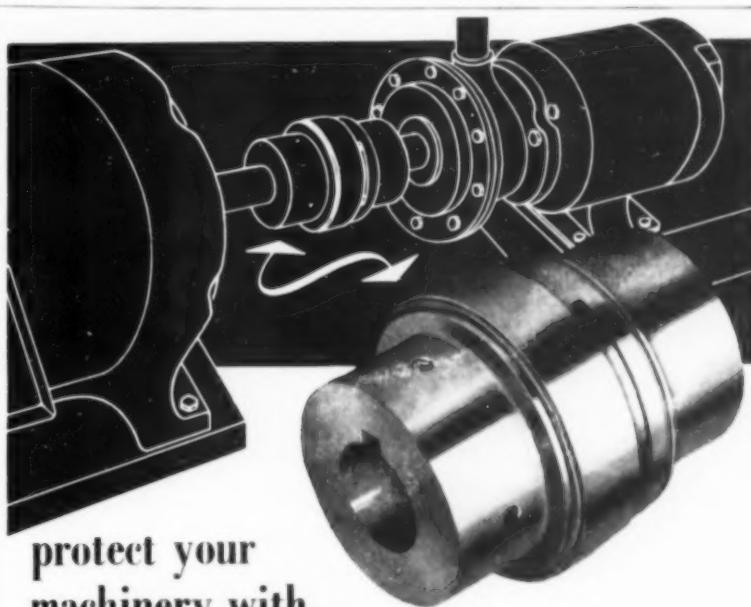
initially available in frame sizes 182 and 184. Larger frame sizes will become available at approximately five month intervals. Production is already underway on the 182 and 184 frames.

New NACE Officers

The NATIONAL ASSOCIATION OF CORROSION ENGINEERS held its 10th Annual Conference March 15-19 at Kansas City.

New officers, whose terms became effective the last day of the meeting, include AARON WACHTER of the Shell Development Company, Emeryville, Calif., president; F. L. WHITNEY, JR., of Monsanto Chemical Co., St. Louis, vice president; and RUSSELL A. BRANSON of Humble Pipe Line Company, Houston, who will be serving his third term as treasurer.

New directors are T. P. MAY, representing active members; and JACK W. HARRIS and HARRY R. BROUH who represent corporate members.



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GAGES**

You get more inches of visibility within centers available... and no blind spots with the New Jerguson Steam Gages with the horizontal expansion loop. The special new compact valve, with horizontal loop that keeps the strain off the gage assembly under varying conditions of expansion and contraction, gives you maximum gage room within the centers.

The special offset single piece gage chamber design with staggered glasses and covers gives you continuous visibility of the water level *with no blind spots* between gage sections.

The gage can be turned at any angle, yet there are no stuffing boxes between gage and valves. The ingenious design of the assembly includes a bracket so the gage will always stay in vertical position. The OS&Y valves have renewable seats and are standard with quick closing stem for chain operation, as shown, or available with plain closing stems and chain wheels.

Made in three designs of single piece chamber for one, two, or three section glass for any W.S.P. Any Jerguson standard gage may be supplied with stems and flanges for use with this expansion loop valve.

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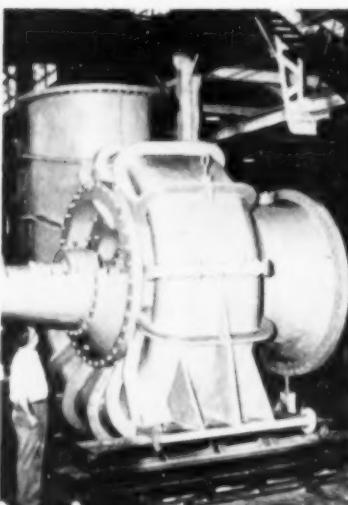
News for the South and Southwest (Continued)

**28 Ton Mixed Flow Pump
For Dow—Freeport, Tex.**

This is one of two 28-ton, 60-in. water pumps, which stand 14 ft high, manufactured by Morris Machine Works, for Dow Chemical's Freeport, Texas, reservoir pumping stations. It has a capacity of 90,000 gpm—the equivalent to pumping 130-million gallons of water a day.

Both pumps are the mixed flow type in which a head is partly developed by centrifugal force and partly by the lift of the vanes on the liquid. This pump type has a single inlet impeller with the flow entering axially and discharging in both an axial and radial direction into a volute type casing. Total head for these particular pumps is 44 ft with a 12 ft suction lift and 32 ft discharge head. Each pump is driven by a 1250 hp synchronous electric motor.

A Rollway type MUC 5248 double width series radial bearing with approximately 17½ in. O.D. is used as the inboard bearing on the impeller shaft of each pump. Each bearing revolves at 257 rpm and supports a load of 17,750 lb. However, at this speed, the rated load capacity is 170,275 lb, which in terms of bearing rating means approximately 3,000,000 hours of life.



This 90,000 gpm capacity pump for Dow Chemicals reservoir pumping station uses Rollway Bearing Company's radial roller bearings. This type bearing has a channel outer race which retains and guides the roller assembly, and has a completely separable inner race. It is especially practical in installations that require frequent removal of the shaft, leaving the outer race and roller assembly in the housing.

Powell Valves—Southeast

THE WILLIAM POWELL COMPANY has announced the appointment of C. BARRY NEILL, JR., of DECATUR, GEORGIA, to the position of sales representative for Powell Valves in ALABAMA, GEORGIA, and MISSISSIPPI.



C. Barry Neill, Jr.

Mr. Neill, who represented Taylor Forge and Pipe Works of Chicago from 1949 to 1953, is well known among engineers throughout the Southeast. He attended Georgia Tech, where he majored in Mechanical Engineering.

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Tom Cook Joins Graton & Knight—Texas-Oklahoma.

TOM COOK has been named sales representative of the TEXAS-OKLAHOMA area by the GRATON & KNIGHT COMPANY, Worcester, Mass.



Tom Cook

Mr. Cook succeeds his father, HAROLD COOK, who was with the company for 38 years. He will operate out of the Dallas office, selling the company's line of leather belting, textile leathers and packings of leather and synthetic rubber.

After serving as an engineer-gunner in the Air Force, Tom Cook studied engineering at North Texas Agricultural College and business administration at Southern Methodist University.

Dr. Seymour New President of Atlas Mineral Products

GEORGE L. WIRTZ, who was recently promoted to Chairman of the Board, has announced the appointment of DR. RAYMOND B. SEYMOUR as President of the ATLAS MINERAL PRODUCTS COMPANY, Mertztown, Pa.

Dr. Seymour, the originator of furan cements and many of the other products of the Atlas line, joined the firm as Chief Chemist in 1939. Since 1949, he has been Executive Vice President and a member of the Board of Directors.

He received his B.S. and M.S. degrees from the University of New Hampshire and his Ph.D. degree from the University of Iowa. After serving as a graduate assistant at both schools, he joined Goodyear Tire & Rubber Co. as a plastics research chemist.

He has also been a research group leader at Monsanto Chemical Co., a Director of the Industrial Research Institute of the University of Chattanooga and Director of Special Products Research for Johnson & Johnson.

Dr. Seymour is the author of approximately fifty patents and more

than one hundred technical publications, primarily on plastics as materials of construction. He was co-author of the "National Paint Dictionary," 3rd Edition 1948, and chairman of the committee chosen by the American Electro-Chemical Society to write a supplement to the "Corrosion Handbook" on plastics. He is author of "Plastics Materials of Construction" to be published this year by Reinhold Publishing Corporation.

He has been an officer of the American Chemical Society and the Ameri-

can Association of Textile Chemists and Colorists. He is chairman of the Thermoplastic Structures Division of the Society of the Plastics Industry and the Industrial Research Education Committee of the National Association of Manufacturers.

Principal products of Atlas are plastic cements, joining materials, linings, coatings, adhesives, plastic pipe, fittings, and fabricated structures. In addition to the company headquarters, Atlas also has a plant at HOUSTON, TEXAS.

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Underhung CRANES

feature Forged Steel Wheels with Hardened Treads

Consistent with the company policy of constant improvement in their products, the Industrial Crane & Hoist Corporation provides FORGED STEEL WHEELS with HARDENED TREADS on Industrial Underhung Model Cranes. This improvement combined with other exclusive "Industrial" features will assure longer service life and lower maintenance costs.

Industrial Underhung Cranes are equipped with patented "Industrial" removable head axles, heavy duty ball and roller bearings throughout, roller chain flex-

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Write for Name of Nearest Agent

a teaspoonful of steam!

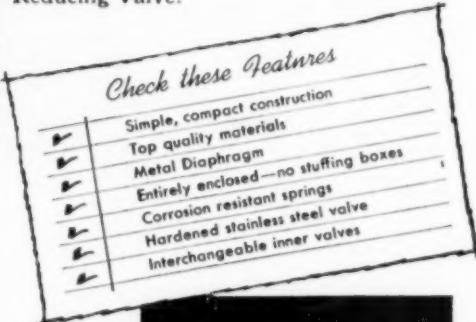


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Reader Comments on "Engineering Talent"

Kentucky engineer offers suggestions to both employer and employee regarding "How to Attract and Hold Engineering Talent"—SP&I for February, pages 80 and 81

"I AM a mechanical engineer, age 54, with a wide experience in several branches of engineering, having been at various times a designer in heating and heat transfer, both high pressure and low pressure, and refrigeration; a plant layout and production engineer for the government; construction engineer; a county engineer, a city engineer, and an assistant city manager.

"It has been my pleasure and my headache to have worked with many young engineers. It has been my experience that the civil engineers are more closely organized, adhering more strictly to the registration laws and code of ethics, both of which are for the benefit of the engineering profession.

"Pick up a roster of Registered Professional Engineers of your state and you will find that for every mechanical engineer registered there are ten (10) or more civil. If the mechanical engineer wishes to retain his status along with M. D.'s and other professions, he must carry his end and support his organizations as doctors support the A.M.A.; otherwise he will be relegated to the position of a labor union tradesman. He must also realize that when he leaves college he is not through but just beginning. Engineering study is a continuous process; at college he gets the basic science, after graduation he must study the related subjects in his special field if he wishes to advance.

"To the employer I would say, the state registration law is for your protection as well as the engineer's. If a prospective employee does not have the initiative or confidence in his profession to register as a professional, do you want him? Would you go to a doctor who was not registered? Even if he were from the best school in the country, you would say he lacks something or he would be registered. The same applies to engineers.

"If you hire an engineer you must always remember one thing. To obtain the best possible relations you must give him the authority commensurate with his responsibilities, as without authority there can be no responsibility.

"I have left good positions because

I was expected to be responsible for work over which I had no control.

"In general it gets back to the saying of one of my professors at school:

"Engineering is four tenths education and six tenths common sense."

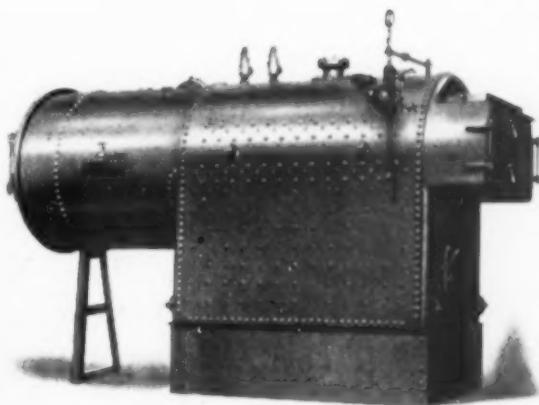
By H. Hardinge, RE, City Engineer, City of Danville, Kentucky.

\$\$\$ For Your Ideas

Plant men continually develop new ideas, methods and gadgets to provide better safety and efficiency on their jobs.

How about exchanging your ideas with others. See page 96.

POWER with POWER to spare



A NEW DOUBLE PASS ALL-PURPOSE INDUSTRIAL AND HEATING BOILER

SOUTHERN MADE FOR SOUTHERN TRADE

Made in sizes from 44 H.P. to 153 H.P. S.B.I. rating with pressure to 150 lbs. Designed for coal, gas or oil firing, the New Lucey Double Pass Boiler can be furnished complete as a package unit.

This boiler is in addition to our regular line of single pass fire box boilers which we have been making since 1918.

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Free literature on the latest developments in equipment and supplies is offered by leading manufacturers. For your copy, circle the item number on one of the reader service post cards provided on pages 17 and 18.

P-1 PIPE INSULATION — Bulletin, 4 pages—Describes the new "Monoliner" lightweight one-piece pipe insulation, including its thermal resistance, permanence, resilience, non-corrosive properties and lower applied cost. Photographs illustrate ease of application. Selection and packaging data are included.—BALDWIN-HILL COMPANY, Trenton, N. J.

P-2 DUAL-PURPOSE COUPLING — Bulletin, 6 pages—Describes the new "Merco" dual purpose pipe coupling for permanent coupling or repair coupling of gas, water and oil lines. Illustrates simple application which requires no tools and no experience and which can be accomplished in seconds.—THE MASTER ENTERPRISE CORPORATION OF AMERICA, Boulder Flig., Tulsa, Okla.

P-3 WATER COLUMNS—Unit No. 232, 2 pages—Describes, illustrates and gives specifications on Jergerson water columns. Principle of operation and features that assure positive alarm signals if boiler water falls to low or rises too high are explained.—JERGERSON GAGE & VALVE COMPANY, 80 Fellowship, Somerville 6, Mass.

P-4 BOILER-BURNER UNITS — Catalog 1931, 16 pages—Contains complete data on entire line of new Kewanee-Rex boiler burner units, to aid in selecting proper unit for any particular application to high or low pressure heating, power or process steam. Fully illustrated.—KEWANEE-REX CORPORATION, 161 Franklin St., Kewanee, Ill.

P-5 STEAM-JACKETED VALVES — Bulletin E-209, 4 pages—Explains design, operation, and special arrangement of steam jackets for handling viscous materials such as heavy petroleum, coal tar, and chemical products, which congeal or harden at atmospheric temperatures and cause trouble with many valve designs. Illustrated with equipment photographs, typical installations, and includes table of dimensions.—EVERLASTING VALVE CO., 53A Fish St., Jersey City 5, N. J.

P-6 LEVELING DEVICES—Brochure, 4 pages—Describes new "Leveling Bar Mounts" for the installation and leveling of heavy machines without bolting or shims, for increased plant mobility, reduced maintenance costs and lessening of the noise level. Illustrated.—HARRY CORPORATION, Dept. L & L, 1100 Pleasant St., Watertown, Mass.

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P-8 FUEL OIL HEATERS — Bulletin 1415, 14 pages—Describes two types of fuel oil heaters, the Twin G-Fin Section with longitudinally-finned heat transfer elements, and the Type B Tubular Heater. Explains design and applications, with sectional views, illustrations of installations, specifications and dimension tables.—THE GRISCOM-RUSSELL CO., Wetmore Ave., Massillon, Ohio.

P-9 BOILERS — Bulletin SB-50, 16 pages—Describes and illustrates complete line of steam generating equipment, with sectional views, diagrams, and plant applications. Condensed reference material for consulting and power engineers.—ERIE CITY IRON WORKS, Erie, Pa.

P-10 TROLLEY BUSWAY SYSTEM — Bulletin No. 49, 44 pages—Describes steel enclosed trolley busway system for electrification of cranes and hoists, assembly and production lines and other moving equipment that must be powered. Special sections cover installation and planning procedure, methods of mounting and typical installations.—FEEDORAIL CORPORATION, 125 Barclay St., New York 7, N. Y.

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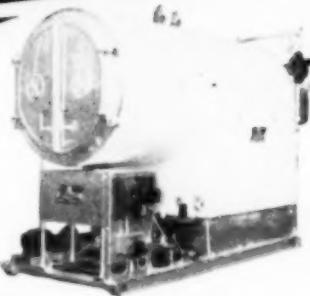
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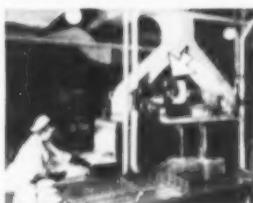
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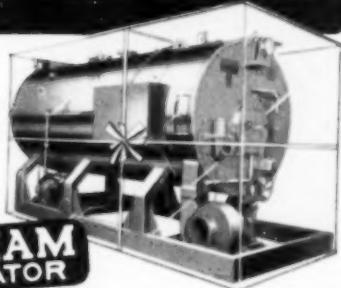
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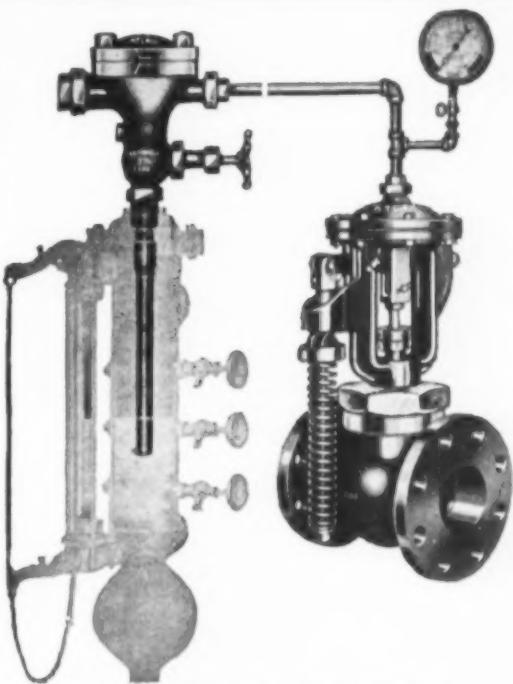
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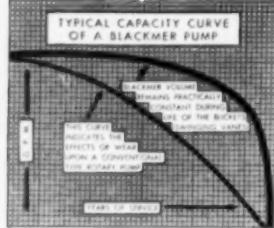
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"... Dear Mr. Montgomery: It is an unbelievable machine and it is still hard to believe that it is actually handling the enormous volume of scrap we are feeding into it. We operate the hog without an attendant—which means a considerable saving.—J. B. Black, Plant Superintendent, Ocala Manufacturing, Ice and Packing Co., Ocala, Fla." C.I.T. Terms Available



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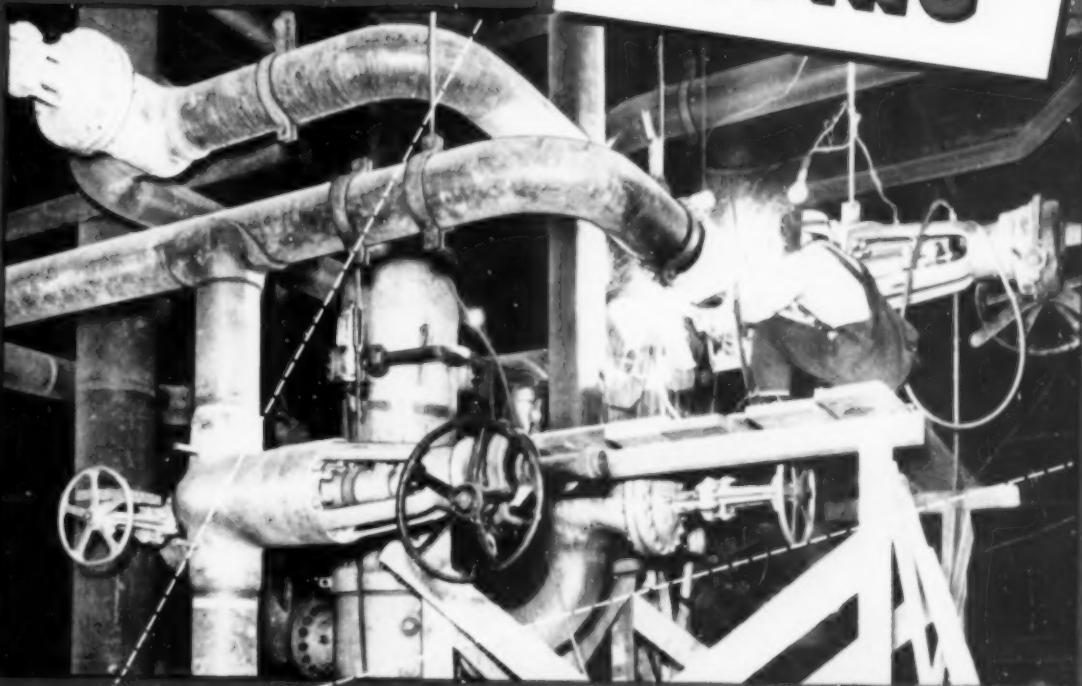
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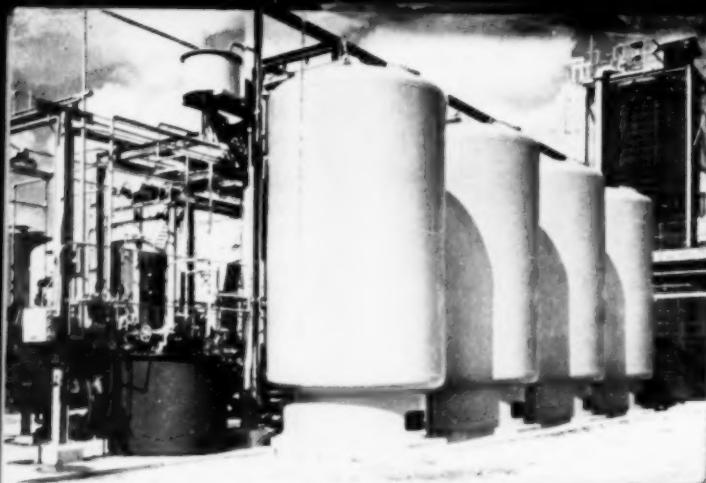
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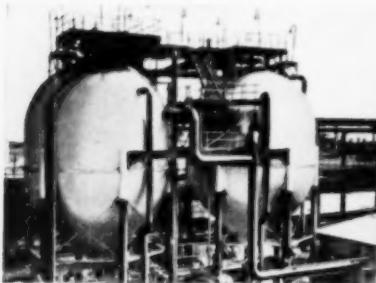
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